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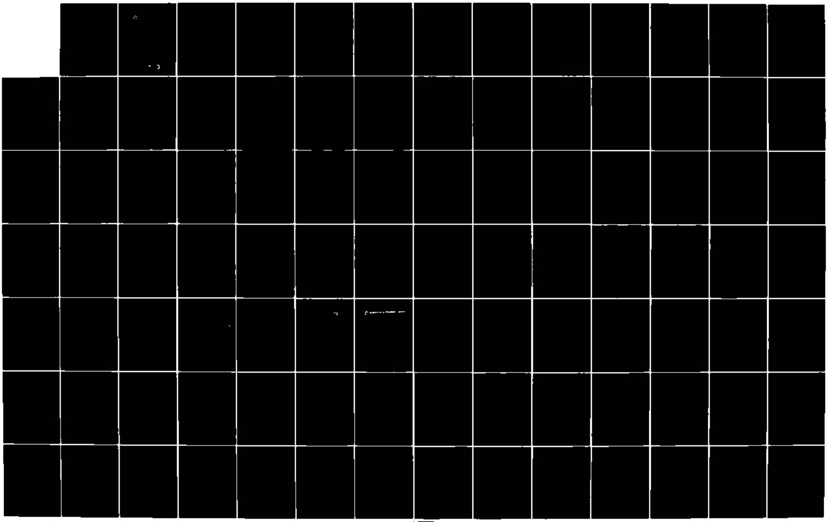

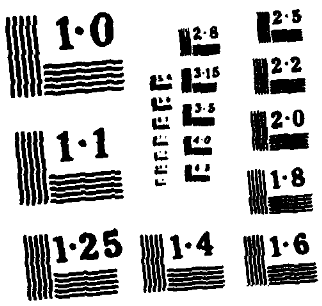
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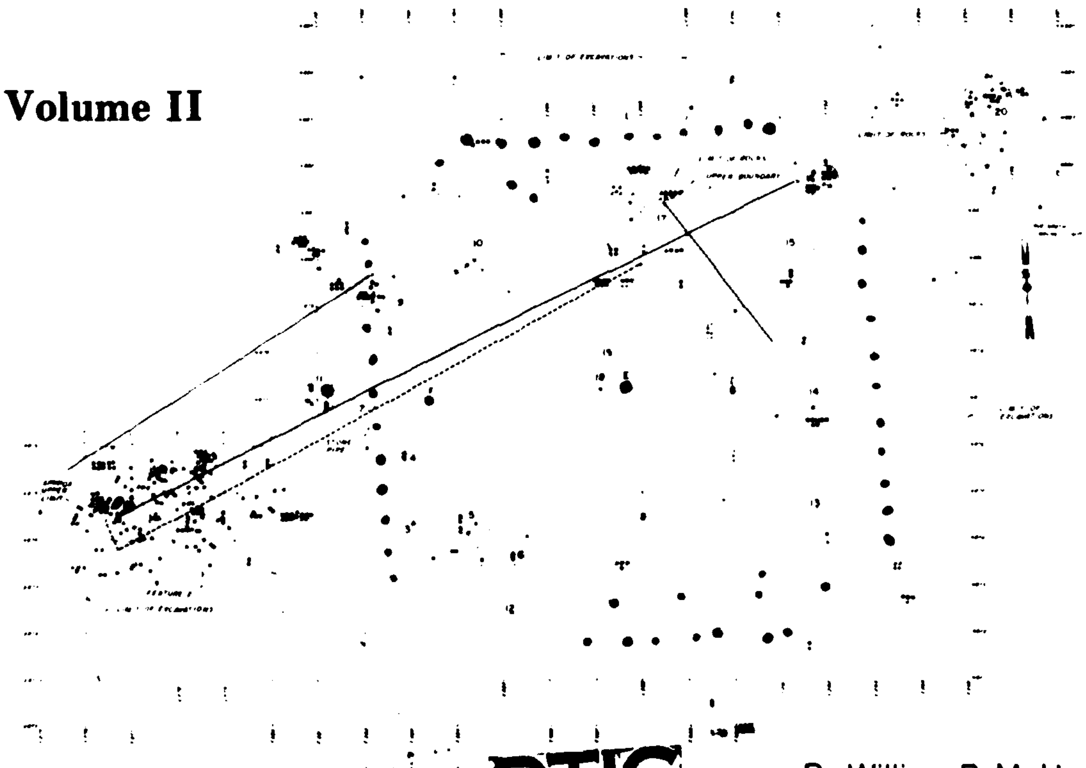
Before Smith's Mill; Archaeological and Geological Investigations

Volume II



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By William P. McHugh
George D. Gardner
Jack Donahue

June 1982

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BEFORE SMITH'S MILL:
ARCHAEOLOGICAL AND GEOLOGICAL INVESTIGATIONS IN THE LITTLE PLATTE RIVER VALLEY WESTERN MISSOURI

VOLUME II: TEXT

PREPARED FOR

DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
700 FEDERAL BUILDING
KANSAS CITY, MISSOURI 64106
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DR. WILLIAM P. MCHUGH, PRINCIPAL INVESTIGATOR
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JUNE 1982

BEFORE SMITH'S MILL: ARCHAEOLOGICAL AND GEOLOGICAL INVESTIGATIONS IN THE LITTLE PLATTE RIVER VALLEY, WESTERN MISSOURI

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APPENDIX A

ARCHAEOLOGICAL MITIGATION

SMITHVILLE LAKE
LITTLE PLATTE RIVER, MISSOURI

SCOPE OF WORK

CONTRACT NR. DACW41-78-C-0121

JUNE 23, 1980

ARCHEOLOGICAL MITIGATION

SMITHVILLE LAKE
LITTLE PLATTE RIVER, MISSOURI

SCOPE OF WORK

1. INTRODUCTION.

a. The Government is currently constructing the Smithville Lake project on the Little Platte River, Missouri. The dam will create a lake of approximately 8,000 acres at multipurpose pool level. Approximately 19,000 acres will be purchased in fee.

b. Several studies dealing with archeological resources in the project area have been previously funded by the National Park Service and the Corps of Engineers. Following is a list of report titles:

(1) 1967. Riley, "Preliminary Salvage Work in the Smithville Reservoir Area, 1967"

(2) 1969. Calabrese, "Doniphan Phase Origins: An Hypothesis Resulting from Archaeological Investigations in the Smithville Reservoir Area, Missouri, 1969"

(3) 1974. Calabrese, "Archaeological Investigations in the Smithville Reservoir Area, Missouri, 1969"

(4) 1976. O'Brien, "Archaeological Survey, Smithville Lake Project; A Final Report"

(5) 1976. O'Brien, "Archaeological Excavations, Smithville Lake"

(6) 1978. O'Brien, "Cultural Resources Survey of Smithville Lake, Missouri" (in reproduction)

c. The work defined herein to be performed by the Contractor is called for in the National Historic Preservation Act of 1966 (P.L. 89-665) and is authorized for funding under Public Law 86-523 as amended by Public Law 93-291. The work defined herein will provide documentation evidencing compliance with Executive Order 11593 "Protection and Enhancement of the Cultural Environment" dated 13 May 1971, Section 2(a).

2. SCOPE.

a. This work encompasses scientific excavation and/or testing of specified sites within the project area and the study of materials recovered in excavation. The Contractor shall conduct this study in a professional manner using accepted methodology, in accordance with 36CFR 66. The Contractor shall be responsible for the preparation of a report of findings, fulfilling the requirements stated under 4.b. Report Content and Schedule.

b. The work identified in this document shall be complete in itself. There will be no assurance from the Government that additional work will follow nor should such work be anticipated.

3. DESCRIPTION OF WORK.

a. Mitigation. Mitigation of adverse impacts on an archeological site can be accomplished by scientific investigation directed toward recovery of data and cultural material. The mitigation action includes analysis of all materials to the extent that the report will be of value to archeologists in future research on the materials. Proper curation of recovered materials and documents is vital. Mitigation does not include funding of such future research, but does require making these materials available for research.

b. Work Description. As a result of archeological investigations, specific sites have been chosen for further work based on adverse impact and potential for producing significant data as outlined in the 1978 O'Brien report. A number of sites in the project area have been excavated in previous studies. The data recovered from these sites is also considered in choosing additional sites to work on. Further mitigation shall include the following work:

(1) Geomorphological studies shall be conducted in two contexts of archeological work:

(a) To identify terrace sequences in order to define areas likely to have buried sites.

(b) To determine the previous extent of erosion on surface sites to be investigated.

(2) Single component Archaic and Woodland sites are lacking in the inventory of surface sites representing a major data gap in the reservoir area. After areas likely to have buried sites are identified by (1) (a), representative areas shall be tested by coring to attempt to locate buried sites.

(3) Site 23CL 226, which contains Late Woodland material, shall be extensively excavated.

(4) The Mississippian period is the best represented and the most studied period in the project area. Significant Mississippian sites that will be impacted are 23CL 208, 225, 229, and 232. The Contractor shall extensively excavate sites 23CL 209 and 23CL 225. The Contractor shall test excavate sites 23CL 229 and 23CL 232.

c. Study Orientations. The Contractor shall submit a written research design, for review and approval by the Government and the Missouri State Historic Preservation Officer prior to initiation of fieldwork. Fieldwork and analysis shall be directed toward the study goals specified in the research design, including those discussed below.

An outline of study goals for the Late Woodland site 23CL 226 shall be part of the research design. Study directions for the Steed-Kisker sites are outlined on the 1978 O'Brien report. Sites 23CL 208 and 23CL 225 shall be investigated to refine Steed-Kisker chronology and the settlement-pattern hypotheses presented in the O'Brien report.

Since site 23CL 208 is a burial mound, one of the more important types of data to be recovered is skeletal information. The excavation of this site shall be directed in the field by a human osteologist experienced in recovering human skeletal materials at archeological sites. Data recovery shall be oriented toward producing data which can be compared to that from site 23CL 108, the Chester Reeves Burial Mound (O'Brien 1978).

Sites 23CL 229 and 23CL 232 are within the shoreline fluctuation zone and testing shall be directed toward determining extent and other factors which may determine further work needed if the sites are affected by erosion. These sites (as well as 231, which is above flood pool and will be protected) appear to represent an anomaly in the settlement pattern for this period; the investigation shall be directed toward examining the placement of the sites in the settlement pattern.

All recovered cultural materials shall be examined to the extent that a description may be included in the report. In addition, lithic analysis shall include chert-type studies.

The description of the study area shall include a discussion of the paleo-environment.

d. Methodology. In order to investigate sites and provide data directed toward the problems presented, the Contractor shall use accepted and appropriate field and lab methods, as set forth in 36CFR 66. These methods shall include but not be limited to the following:

(1) Collect material to provide supportive data to discuss the problems specified in 3. Description of Work.

(2) Perform ancillary studies (geological, botanical, and zoological) when applicable. These studies shall include geomorphological, osteological, and paleo-environmental studies.

(3) Photographic record of fieldwork including black and white photos and illustrations of diagnostic features and artifacts by either black and white photos or line drawings.

(4) Record provenience of materials and features including maps and graphs when applicable.

(5) Collect materials for absolute dating (e.g. radio-carbon) when appropriate.

(6) Process, catalog, and curate all recovered materials.

(7) Make an analysis of all materials to provide a description for future use by the archeological profession as research data. Discarding of cultural materials after field analysis shall not be made without specific prior written approval of such action by the Corps of Engineers.

(8) Perform all measurements using the metric system.

4. SCHEDULE OF WORK.

a. Coordination and Meetings. The Contractor shall pursue the study in a professional manner to meet the schedule specified in 4.b. Prior to initiation of actual fieldwork, the Contractor shall coordinate all field schedules and activities with the appropriate project cultural resources coordinator, and the State Historic Preservation Officer. During the course of the study, the Contractor shall submit a monthly progress report to the Government. In addition, the Contractor shall review progress of work performed with representatives of the Government and the State Historic Preservation Office (SHPO) at meetings as follows:

(1) Coordination meetings with the Government including at least one during the field season at field headquarters and one during the laboratory and analysis period at the Contractor's facilities.

(2) One meeting, early in the report-writing phase, at the SHPO's office with representatives of the SHPO, the Contractor, and the Government to discuss findings, report content, and format.

(3) One meeting at the Kansas City District Office to discuss the review of the draft report.

b. Report Content and Schedule.

(1) A report of findings shall be prepared by the Contractor. The main text of the report shall be written in a manner suitable for reading by persons not professionally trained as archeologists. Detailed presentation and discussion of data of interest to the archeological

profession shall be included in a second part of the report and/or in appendixes. The report is intended to be of use and interest to the general public as well as of value to the profession. Use of illustrations is encouraged.

(2) The report shall be authored by either the archeologist or project director. If the project director is not the author, he shall review and edit the report prior to submission of the draft and final versions.

(3) Thirteen (13) copies of a complete draft of the report shall be submitted to the Contracting Officer for purposes of Governmental review within 15 months of notice to proceed. (If excessive inclement weather or other delays occur, this date may be extended to one mutually agreed upon between the Government and the Contractor.) In addition, the Government may send the draft report and Scope of Work to three qualified professionals not associated with a State or Federal Governmental agency for peer review of the merits and acceptability of the report. After the review period of approximately two (2) months the Government will return the draft to the Contractor. The Contractor shall complete necessary revisions and submit the final report within 60 days after receipt of the reviewed draft. The Contractor shall submit one set of original and two copies of the final report of findings. One of the copies shall be in assembly form. The Government will review the final, and after approval, the Government will reproduce this report and provide the Contractor ten (10) copies for personal use, plus two (2) copies for each major contributing author.

(4) The report shall include the following:

(a) Description of the study area, including paleoenvironmental reconstruction and description of the geomorphological studies.

(b) A discussion of each site investigated and the analysis results. A detailed description of sites and artifacts, presented both in support of the discussion in the text and also as data of value for professional use of the report;

(c) A detailed description of the methods used in field and lab work;

(d) Any recommendations which may contribute to cultural resources management program for the operating project, including any suggestions for the archeological portion of the interpretive program;

(e) Illustrations, photos, maps, tables, and graphic representations of data appropriate to the text, such as illustrations of diagnostic artifacts;

(f) Maps of the project area with known sites, indicating which were excavated, which were tested, cultural affiliations, and other pertinent information. (Color overlay reproduction is available.) Maps for inclusion in the report must be drawn in a such a manner that exact site locations are not disclosed.

(g) A glossary of terms;

(h) Reference section with all sources referred to in text or used for report, personal communications, interviews, bibliography, etc.;

(i) Copies of all correspondence pertaining to the review of the draft report. These are to include the comments of the State Historic Preservation Officer, National Park Service, and any peer reviews by professional archeologists which are provided by the Government together with responses to each of the comments given. The Scope of Work is to be included in this section; and

(j) Listing of principal investigators with their qualifications, and a list of field and lab personnel as an appendix.

(5) Finals originals shall be typed single-spaced on one side of paper with the margins set for reproduction on both sides of 8 X 10-1/2 inch pages; margins on the left of right side pages and on the right of left side pages shall not be less than 1-1/4 inches; margins on the right of right side pages and on the left of left side pages shall be less than 3/4-inch wide. All pages shall be numbered. All text and illustrations shall be of reproducible quality.

c. Other Information. Four copies of materials not suitable for publication in the report shall be submitted with the draft. These materials include excavation data forms, feature maps, large amounts of statistical analysis data, repetitious photographs, a complete listing of all materials recovered, and other documentation not of interest to most readers of the report. Averages, graphs, or summaries of statistical data are to be included in the publishable report. Large masses of specialized statistical data, such as certain artifact measurements, shall be stored on computer tapes or in microform so that it can be made readily available to interested persons. Publication of such bulk statistics in the report is not appropriate. An NTIS Form, available from the National Technical Information Service, U.S. Department of Commerce. Springfield, Virginia 22161 shall be completed and inclosed.

d. Materials Not for Release. Materials dealing with exact site locations are considered confidential and are not published or released. Materials which shall accompany the report but not to be included in the report include:

(1) Two copies each of USGS and base maps with exact locations of sites, and of areas where geomorphological tests were made.

(2) Four copies of survey forms for any newly recorded sites discovered incidental to this contract.

e. Storage of Materials. Attached to the letter of transmittal for the final report shall be a listing of all cultural materials found during the field investigations, and a Certificate of Authenticity for the materials. These collections shall be properly stored in containers clearly marked "Property of the U.S. Government, Corps of Engineers, Kansas City District." These materials shall be stored at a repository mutually agreed upon by the Government, the Contractor, and the State Historic Preservation Officer. Retrieval of these materials by the U.S. Army Corps of Engineers for use by the Government is reserved. If the materials are to be removed from the curatorial facilities, this action must be approved in writing by the Contracting Officer. If the materials are stored out of the State of Missouri, they are subject to recall for curation in the State of Missouri at such time as adequate facilities are made available by the State.

5. FURTHER RESPONSIBILITIES OF THE CONTRACTOR AND GOVERNMENT.

a. Data Availability. The Government shall provide the Contractor with available background information, maps, remotely-sensed data reports (if any), and correspondence as needed. In addition, the Government shall provide support to the Contractor regarding suggestions on data sources, format of study outline and report, and review of study progress.

b. Right-of-Entry and Crop Damages. The Contractor shall have right-of-entry on all property owned by the Government. Compensation for damages to crops planted on Government property leased to various individuals shall be the responsibility of the Contractor.

c. Publication. It is expected that the Contractor and those in his employ may during the term of the contract present reports of the work to various professional societies and publications. Abstracts and outlines of those reports dealing with the work sponsored by the Corps of Engineers shall be sent to the Kansas City District Office for review and approval prior to presentation or publication. Proper credit shall be given for Corps-sponsored work, and the Corps of Engineers shall be furnished six (6) copies of each such paper and/or published report.

d. Court Testimony. In the event of controversy or court challenge, the Contractor's principal investigator(s) (that person(s) responsible for the validity of the material presented in the report) shall testify on behalf of the Government in support of the report findings.

e. Safety Requirements. The Contractor shall provide a safe working environment for all persons in his employ as prescribed by EM 385-1-1, "General Safety Requirements." A copy of which will be provided by the Government.

f. Evaluation of National Register. The Contractor shall evaluate sites investigated to determine their suitability for nomination to the National Register of Historic Places. The Contractor shall make recommendations to the Government for the preservation, management, and nomination of those sites which appear to qualify. If a potential National Register site exists, the Contractor shall prepare all National Register forms and submit them to the Government for review and processing. After excavations are complete, the Contractor shall document in writing the conditions of the site, in accordance with 36CFR 63.

6. STAFF AND FACILITY REQUIREMENTS.

a. Project Director and Archeologist. Minimum qualifications are set forth in 36CFR 66 App. C, and in the Missouri Office of Historic Preservation Guidelines.

b. Osteologist. The minimum formal qualifications for individuals practicing osteology as a profession are a BA or BS degree in physical anthropology and/or biology from an accredited college or university, followed by 2 years of graduate study with concentration in human anatomy, and some work in comparative anatomy. A Master's thesis or its equivalent in research and publications is highly recommended, as is the PhD degree. The individual must have experience in osteo-archeology.

c. Consultants. Personnel hired or subcontracted for their special knowledge and expertise must carry academic and experiential qualifications in their own fields of competence.

d. Equipment and Facilities. The Contractor must also provide or demonstrate access to:

(1) Adequate permanent field and laboratory equipment necessary to conduct operations defined in the Scope of Work; and

(2) Adequate laboratory and office space and facilities for proper treatment, analysis, and storage of specimens and records likely to be obtained from the project. This does not necessarily include such specialized facilities as pollen, geochemical, or radiological laboratories, but does include facilities sufficient to properly preserve or stabilize specimens for any subsequent specialized analysis.

GAI CONSULTANTS, INC.

APPENDIX B

G.A.I. CONSULTANTS ARCHAEOLOGICAL MITIGATION

PROGRAM AT SMITHVILLE LAKE — 1978

INTERIM REPORT, JANUARY 1979

Prepared by

William P. McHugh

Principal Investigator

APPENDIX B

G.A.I. CONSULTANTS ARCHAEOLOGICAL MITIGATION
PROGRAM AT SMITHVILLE LAKE - 1978

INTERIM REPORT, JANUARY 1979

Introduction

The purpose of this report is to briefly summarize the status of the archaeological mitigation program at Smithville Lake as a basic step in developing plans for conducting future mitigation efforts. In part, this summary will describe the results of our 1978 field investigations and will identify those sites we believe require additional testing or excavation. Another part of this report represents our evaluation of previously recorded and some newly discovered sites for testing and/or excavation. G.A.I. Consultants' recommendations will conclude this interim report.

Results of Field Investigations

G.A.I. Consultants' field investigations comprised two components, 1) the excavation or testing of a selected series of archaeological sites specified in the Corps of Engineers contract, and 2) the locating of buried archaeological sites through a program of subsurface testing based on the data on site location and geomorphic events acquired in our archaeological and geological research.

The archaeological site mitigation will be described first. Site 23 CL 208, a purported burial mound, was the first to be examined. It became quickly obvious that this small conical mound was indeed artificial but was nothing more than a recent pile of dirt. The mound fill contained only a few historic artifacts (e.g. iron nails, barbed wire). Our examination included putting a meter-wide trench half-way through the mound and digging several 1 m x 1 m test pits around its periphery. Although the mound was proven not to be a prehistoric burial mound, its investigation provided an opportunity for partially training our newly hired crew members.

Site 23 CL 225 is a multi-loci site situated on the flood plain and on a ridge bordering the Little Platte River on the west between County Highway W and the mouth of Camp Branch. In order to locate the several reported loci, we had to have the six to eight foot high weeds reduced by discing 50-60 acres. Then large areas on the flood plain and ridge were scraped bare by a Caterpillar 627 B. This scraping removed all surface vegetation and the top two to three or more inches of soil and allowed us to inspect the newly formed surface in the path of the scraper. In all, we found five loci with cultural remains at CL 225. We conducted intensive excavations at four of them, two on the flood plain and two on the ridge. The two flood plain loci proved to be disappointing. Although baked earth (daub), some pot sherds, and chert flakes were recovered, almost all of it was from the plow zone. We found no assuredly undisturbed cultural remains and no detectable stratigraphic zonation (other than the plow zone) in the dark alluvial deposits.

The ridge-top loci proved to be quite another story. The machine-scraped surfaces had exposed chert flakes, some sherds, and baked earth as on the flood plain. In addition, some darkly-stained areas could be detected in the light brown soil. We selected two loci for extensive testing, one at about 1050 m north on our baseline, the other at 870 m north. The 870 m N. loci produced a large prehistoric structure represented by four rows of postmolds arranged in a square which measures almost 11 m by 11 m. Included within the structure, were other postmolds, several small to medium pits, and one hearth (a concentration of fire-burned rocks). Some pottery and lithic remains were recovered from within the structure and the pits. A second hearth was discovered outside the northeast corner of the "house" but couldn't be fully excavated due to the necessity to shift our excavations to CL 226.

The locus at 1050 m north produced a curious and complex feature consisting of an area with a considerable amount of baked earth, some with plant impressions. Three dense concentrations occurred with this area; they were separated by a .7 to 1.0 m wide zone. Another denser concentration of reddish colored baked earth occurred among these three concentrations but at a lower level and filled a small, carefully prepared basin. Two adjacent postmolds complete this perplexing feature. Some potsherds were recovered from this feature and some good charcoal samples were collected from it. We should be able to obtain a radiometric age determination on this feature and the pottery. Immediately east of this complex is a dark stained area spread over several square meters. We didn't have time to excavate this feature because we had already spent more time on the investigations of the several loci at CL 225 than originally scheduled.

Site 23 CL 226 is located on the end of a ridge on the east side of the Little Platte River about one km north of CL 225. It was reported to have an historic and an earlier, Late Woodland component. This historic component was clearly in evidence on the surface in the form of broken glass and kitchenware, rusty metal scraps, and a stone-lined well. The visible prehistoric materials consisted of a few flakes and chips of chert and some fresh-looking mollusc shell fragments. The site surface vegetation was removed using a front-end loader. This scraping exposed only two prehistoric features, one a very productive hearth filled with much broken pottery, burned rocks, and charcoal, the second with similar materials but in much smaller quantities. The pottery from the first feature is a thin, plain shell-tempered ware, that from the second is a plain, grit-tempered ware. Metal objects (nails) came from the plow zone above the second feature along with prehistoric potsherds and lithics. No other prehistoric features or <u>in situ</u> materials were recovered.from CL 226. The historic remains were confined to the surface and the plow zone. The fresh looking molluscs had a surface distribution similar to the historic artifacts and may have been brought to the site, as one visitor suggested, for addition to the garden soil in recent times. In all, CL 226 was disappointing because of the lack of substantial in situ prehistoric remains. However, we should be able to get a radiometric date on the charcoal from the first hearth at least, and perhaps from the second, as well.

Following the completion of our work at CL 226, we moved to the sites located along Camp Branch creek near Arley, about 10 miles east of Smithville. Two sites required our attention, CL 229 and CL 232. They had been described as Steed-Kisker sites located in anomalous situations, that is, in the uplands well above the flood plain of the creek. We were to test these two sites to appraise their contents and the erosional threat to them posed by the fluctuations of the Smithville Lake.

CL 229 is located on the end of a northward sloping ridge. The ridge has been steeply eroded on its northern end and eastern margin. The ridge slopes moderately toward the west until it meets a tributary creek. Our testing program was designed to sample a large area since the precise location of the site could not be determined from the available information. Dozens of 1 m x 1 m test pits were excavated with only minimal removery of cultural materials, all of which was restricted to the well-defined plow zone. We employed a tractor with a blade to scrape the heavy weed and grass vegetation from several 2-3 m wide swathes up to 30 m in length. Again, the results were discouraging and we dispensed with machine clearing at CL 229. Not until we moved our testing program into the trees along the crest of the bluff did we begin to recover in situ materials. These cultural remains including ceramics and lithic implements are found to a depth of almost one-half meter, often among and below the roots of trees. This artifact bearing zone is situated right at the edge of a steep bluff which is an erosional face on the outside of an abandoned stream channel located at the base of the bluff. This bluff face and crest will be particularly vulnerable to wave action and fluctuating lake levels. The edge of the crest of the bluff is at an elevation of about 870 feet above sea level. The recreational pool level will be 864.6 feet, the drawdown stage somewhat below that, and the flood stage 876 feet. It would appear that site 23 CL 229 will be innundated at times, but more commonly will be a few feet above the level of the Smithville Lake in a zone of potential erosion caused by flucuating pool levels and wave action.

Site 23 CL 232 is located north of Camp Branch creek, almost directly north of CL 229 at an elevation of 850-860 feet abbve sea level. CL 232 posed several difficulties. It was difficult to precisely determine the site's location because the field was planted in heavy grass. We began by excavating numerous shovel test pits across the area where we thought the site should be. None of these produced any cultural material. Brian O'Neill, who had performed the archaeological site survey in 1976, graciously consented to come out and show us the site location. He did and it proved to be a spot where we had dug the shovel test pits with negative results. In an attempt to determine if undisturbed cultural remains were present, we finally employed a tractor and blade to remove the vegetation from several long swathes across the supposed site locus. Incredibly, almost nothing was found, the only exception being a small lot of chert cores found together in the mucky alluvium. Having exerted considerable effort and resources to find and test the site and having failed to produce any significant evidence, we feel 23 CL 232 can be excluded from consideration for further mitigation.

Geological Investigations and the Search for Buried Sites

The final part of the archaeological field investigations involves the identification and examination of locales thought to have reasonably good potential for having subsurface prehistoric sites. This phase reflects that requirement of the contract which stipulated the need to develop a model combining geomorphological and archaeological input to attempt to locate buried sites of the Archaic and Early Woodland cultural stages. Our geological investigations, from the outset, were designed to develop a model of the geomorphic history of the valley. The initial field work involved investigating the various deposits found in the Little Platte valley, from those on the hill tops to those on the flood plain. This was accomplished using a back-hoe to excavate deep test pits (3 to 4 meters deep) and by utilizing the Corps of Engineers' drilling logs for the dam construction. In addition, a drill-rig was employed to obtain samples in abandoned meander channels for pollen analysis. The pollen analysis may provide the first definitive information regarding the late Pleistocene and Holocene environments in this region.

George Gardner, project geologist, directed the geological investigations; he recorded the results of his examinations of the trench walls and obtained sediment samples for laboratory tests. Although this phase was not primarily designed to locate archaeological sites, Gardner continued to be on the look out for buried cultural materials. He found only one pottery sherd in one of his trenches and a point base from the plow zone at another spot. In his investigations on the first and second flood plain terraces at CL 225, Gardner determined that the depth of the water table was about four feet below the surface, a situation which effectively precluded any deeper archaeological probing on the flood plain.

The shallow depth of the water table on the flood plain affected our subsurface site survey program since it demonstrated we could not explore very deeply in our search for buried sites on the flood plain. The preliminary findings of the geomorphic investigation indicate that "deeply" buried sites may not exist above the second flood plain terrace (where CL 225 is located, for instance). However, this conclusion is tenative and may need to be revised pending further investigation. After discussing the matter, Gardner and McHugh agreed to revise the strategy for seeking buried sites. The three courses we decided to follow were: 1) to locate fossil (old, abandoned) stream channels through the careful examination of topographic maps, stereoscopic aerial photographs, and field inspections and to inspect the areas (terraces, levees, flood plain) in proximity to the fossil channels, 2) to locate locales along the river which corresponded to those with reported or known archaeological sites and to survey these locales by pedestrian examination; 3) to recommend the testing of three in-filled stream channels.

Gardner's geomorphological investigation has led to the development of a preliminary model which has been used to identify locations where deeply buried sites may occur. These locations consist of in-filled stream channels on a terrace slightly elevated above the present flood plain. This terrace is designated the T_1 terrace; it may have been the active flood plain during the Archaic and Early Woodland periods. This hypothesis requires further testing by a program involving the subsurface examination of the in-filled channels and their former banks and point bars in order to recover geomorphological data and associated cultural evidence if these exist.

We have located three segments of in-filled stream channels on the T_1 terrace which recommend for investigation for the following reasons:

1. If the T_1 terrace was the active flood plain during Archaic times, it may be the only geomorphic feature covered by a thick accumulation of sediment since that period; it is on this terrace then that we may expect to find sites of the Archaic period.

2. Auger boring in one of these channels has already revealed the presence of stones at depths of about 4 meters; their presence is difficult to explain by natural processes and the possibility that they were introduced by human agencies needs to be investigated.
3. Elsewhere, physiographic situations identical to these in-filled channels have produced evidence of Archaic occupation. For instance, at the Coffey site on the Big Blue River in Pottawatomie County, northeastern Kansas, Schmits (1978) found Archaic cultural materials within an in-filled stream channel.

Investigations of the three in-filled channels we have recommended for study will necessitate the use of a backhoe for the deep excavations and, in one instance, a bulldozer to clear a path to the site.

Our first attempts to locate subsurface sites along fossil stream channels took place near CL 229 where three abandoned channels were located. We employed a tractor with scraping blade to clear heavy surface vegetation from the levee next to one fossil channel and adjacent to the modern channel of Camp Branch creek. The first attempt next to an old channel north of CL 229 produced immediate success by exposing pottery just below the surface. Our second attempt in a different place exposed what may be fire-burned rocks. We delayed further explorations of these two loci because this phase of the program was conducted only to locate subsurface sites in accordance with the Corps of Engineers contract stipulations. Testing and/or excavations of these newly found sites could not be conducted due to the constraints imposed by the contract, weather, and time and manpower limitations.

Gardner examined the aerial photographs and recommended places along the Little Platte for pedestrian examination. We put a crew of four individuals under Marc Collier's direction into the field to accomplish this site survey.

Some of the areas selected by Gardner were easily examined for they had been largely cleared of vegetation by the clearing operations along the river. Other locales proved to be impossible to effectively examine because of dense vegetation and ground cover. The pedestrian survey of the selected locales was conducted over a period of about 2 weeks (Nov. 22 to Dec. 5) when weather conditions, ground conditions, and available manpower permitted. Rain, freezing rain, snow, muddy ground, frozen ground, sub-freezing temperatures, bone-chilling winds and holidays are factors which affected the scheduling and duration of the site survey.

In spite of these conditions, we were able to carefully examine about 284 acres of ground surface in 19 different tracts. All were located close to the Little Platte River between Camp Branch and Highway D in southern Clinton County, a distance along the river of about 8.7 miles (14 km). These 284 acres represent less than 1.5% of the total area to be occupied by the Smithville Lake and its contiguous federally-controlled borderlands. Thirty-one separate loci with artifactual materials were discovered and twelve were considered to be significant enough in terms of the quantity of materials or the presence of diagnostic artifacts to warrant reporting to the Missouri Archaeological Survey for assignment of site numbers. These sites range in cultural affiliation from Archaic to Middle Woodland. Since sites of these cultural stages were required to be sought in our subsurface testing program, some of them should be scheduled for testing.

The success of our site survey program can be attributed to a number of factors: 1) the careful selection of locales for examination; 2) the sparcity of vegetation cover in most of the areas examined; and 3) the care with which the survey was carried out. It should be pointed out that most of the area we surveyed for sites had been previously surveyed when conditions for finding sites were less than ideal. A major lesson to be learned from our site survey program is that a final survey should be conducted after the vegetation clearing operations have been completed. A second lesson is that careful selection of locales will enhance the likelihood of discovery of previously unknown prehistoric sites. The sites we feel have the most potential for producing valuable information on the prehistoric occupation of the Little Platte Valley are listed in the next section.

Newly Discovered Sites Recommended for Testing or Intensive Excavation

Of the **twelve** newly discovered sites, seven are strong candidates for further testing or intensive excavation. These sites will be briefly listed along with the reasons why they are recommended for mitigation efforts.

The sites in Clay County are:

*23 CL 271: a possible early Archaic site on slope of an old terrace, east side of Little Platte River, opposite 23 CL 225. Lithics include one complete, contracting-stem point (? Hidden Valley-Langtry), a lanceolate-shape drill, some biface fragments, retouched flakes, and cores. Reason for recommending testing: no early Archaic sites have been tested or excavated.

*23 CL 272: north of the new bridge over the Little Platte, 40 m east of the river on the valley slope at 850 feet above sea level. Lithics include part of a large corner-notched projectile point fragment, a unifacial, double end-scraper, biface fragments, and 35 flakes. Also found was one abraded, grit-tempered sherd. The possible Woodland affiliation of this site warrants its testing.

*23 CL 269: this site is located on an old bank or levee of a fossil channel of Camp Branch creek, 300 m northwest of site 23 CL 229, at an elevation of 860 feet above sea level. Found in our first subsurface explorations, it consists of a concentration of sherds and lithic materials which were not collected pending a visit by KC COE personnel for in situ examination. Cultural affiliation, not certain, probably late ceramic phase (e.g. Steed-Kisker).

*23 CL 268: a second locus exposed on our subsurface exploration near 23 CL 229. Located on a knoll 20 m south of the present Camp Branch channel, probably an older levee, at 855 feet above sea level. Materials consist of fire-cracked rock left in place for examination.

These two sites, along with CL 229, are recommended for further testing or excavation to answer the question, raised by O'Brien (1978), why Steed-Kisker sites near Arley are in such an anomolous geographic location. Additionally, work at CL 229, CL XX, and CL YY should produce materials (ceramics, lithics, charcoal) which will allow age estimates to be made by comparison and by radiocarbon dating. In addition, a clearer picture of river channel changes and paleogeographic changes over the past thousand or more years should emerge from these investigations.

The Clinton County sites are:

*23 CI 65: north of Trimble Wildlife Refuge, on the east bank of the Little Platte 265 m above the mouth of Lynn Creek. Two, surface decorated, grit-tempered potsherds and one shallow, corner-notched point fragment suggest a Woodland designation for this site. This affiliation and the fact that part of the site is located among trees where it may have undisturbed cultural deposits lead to the recommendation for its testing.

*23 CI 64: southwest of Trimble Wildlife Refuge, west of the Little Platte on the second terrace. Biface fragments, a core, 8 utilized flakes, 41 flakes, 4 abraded stone specimens were collected and more was left on the surface. Lack of pottery suggests a possible Archaic affiliation which, along with the abundant lithics, leads to the recommendation for further testing.

*23 CI 62: southwest of Trimble Wildlife Refuge, on the first terrace above the flood plain, west bank of the Little Platte. A reworked projectile point (converted into a graver), other projectile point fragments, a hinge-flake scraper, biface fragments, cores, sandstone abrader, a hammerstone, and numerous flakes indicate the potential of this site. CI 26 is provisionally assigned to the Archaic stage. For this reason and its apparent potential we recommend it for testing.

Previously Recorded Sites Which Should be Considered for Mitigation

Previously recorded sites should be considered for mitigation for three reasons:

1. they will be physically destroyed by construction activities related to the development of public areas, access roads, or other facilities (sewage treatment operations, water treatment plants, camping grounds, underground utilities, marinas, parking lots, etc.);
2. they represent the type of site which has been insufficiently investigated in the archaeological research so far conducted in the Smithville Lake;

3. their locations are in actual or potential public use areas where pedestrian and other activity (e.g. off-road recreational vehicle, agricultural) could have a detrimental effect on the sites.

Sites in category 2 are numerous and have been expanded in number by GAI Consultants' field activities as described above. By cultural affiliation, sites in this category belong to the Archaic and Woodland stages, in time from ca. 7000 BC to AD 1000. As identified in GAI Consultants' proposal for the Smithville Lake mitigation program, the following sites should be considered for mitigatory investigation:

Clay County

CL 117 - Archaic
CL 197 - Late Archaic

Clinton County

CI 45 Multiple component (Middle Archaic, K.C. Hopewell, Steed-Kisker)
CI 34 Late Woodland, Steed-Kisker
CI 28 Late Archaic
*CI 37 Middle Archaic

Sites in category 1, those which will be destroyed by construction activities in public-use areas, must receive the most serious consideration for mitigatory efforts. The sites included in this category are listed below along with the public-use facility which threatens the site:

Clay County:	Project Location
CL 213, Historic farmstead	Crows Creek - Camp Branch, south segment, hiking trail (Plate 12, Master Development Plan)
CL 104, Late Archaic	Camp Branch camp grounds, toilet facility, and access roads (Plate 12, M.D.P.)
CL 211, Historic farmstead	relocated road, County E, south of Paradise, north of new bridge

NOTE: this site may already have been altered by road construction.

CL 227, Historic House site	Little Platte north segment-access road to camp grounds south of relocated Route W. (Plate 11, M.D.P.)
CL 235, Steed-Kisker	Little Platte north segment, parking lot, access road, and hiking trail, north of relocated Route W. (Plate 11, M.D.P.)

NOTE: Also located in this planned public-use area is 23 CL 108, a Steed-Kisker burial mound, excavated and reported on by O'Brien (1978) and Finnegan (1978). It should be again examined to see what measures need be taken to keep it from being vandalized or illictly explored. A covering of earth may be a simple and adequate solution.

CL 223, Paleo-Indian, Archaic, K.C. Hopewell, Late Woodland, and Steed-Kisker Components. CL 222, Archaic and Steed-Kisker components.	These two sites are located below the dam, on land where a water treatment plant for Kansas City, Mo. is planned for construction.

Clinton County:

CI 21, Early and Late Archaic Middle and Late Woodland; Steed-Kisker	Honker Cove area, access road, and electric power lines, road to Educational Group Camp. (Plate 20, M.D.P.)
CI 54, Prehistoric with undetermined cultural affiliation	Plattsburg Park, parking, access road, tot lot. (Plate 15, M.D.P.)

Nine sites have been identified which will or may be affected by land-altering developments associated with public-use projects planned for the Smithville Lake, or for a water-treatment plant for Kansas City, Mo. or a city park in Plattsburg, Mo. Sites in category 3 have not been identified since the various potential activities threatening prehistoric sites are not yet known or predictable.

It is clear, however, that planned public-use projects in the Smithville Lake area do seriously threaten several known and recorded archaeological sites. The potential impact of these projects on these sites needs to be appraised and programs of altering the projects or salvaging the archaeological data are mandatory.

Summary and Recommendations

This interim report has reviewed the 1978 field work of GAI Consultants in the Smithville Lake reservoir. Our site testing and excavation program, as required by our contract with the Corps of Engineers, has examined five sites, one a multi-loci site complex. Our investigations have determined that no further work is needed at three sites (23 CL 208, 226, and 232) and at most loci of site 23 CL 225. Two of the tested or excavated sites require, in our opinion, further excavations:

1. 23 CL 225, N870 and N1050 loci, where partially exposed features had to be left in place because of the need to move onto other sites; these features need to be excavated in order to complete recovery of settlement and subsistence data associated with the large 'house' at N870 and with the burned area at N1050;
2. 23 CL 229, where in situ cultural materials were discovered along the bluff-crest, an area which will almost certainly be adversely affected by changes in the lake levels of Smithville Lake and by shore-line erosion.

A revised program of subsurface site exploration combining tractor-clearing, back-hoe trenching, and standard pedestrian site survey of areas selected because of proximity to fossil stream channels and stream-bordering terraces located 12 previously unreported sites. Seven of these sites warrant phase II testing, some may deserve phase III investigations (intensive excavations), especially those of Archaic and Woodland cultural affiliation.

The locations of recorded archaeological sites were evaluated in terms of public-use projects planned for the Smithville Lake borderlands. Nine sites are potentially in jeopardy because of the planned development of such projects as camp grounds, access roads, water-treatment plants, etc. Special attention must be paid to these sites since they are in danger of being destroyed by federally-funded projects.

Finally, in addition to selecting locales and geomorphic features with potential archaeological remains, the geological investigations of Gardner led to the identification of a possible Archaic period flood plain. Entrenched within this now elevated terrace are three segments of ancient, sediment-filled, stream channels. The systematic exploration of these three in-filled channels by backhoe excavation is recommended to search for buried sites of the Archaic and Early Woodland periods and to contribute to the refinement of the model of the geomorphic history of the Little Platte River Valley.

NOTE: The asterisked site numbers on pages B-9, B-10, B-11, and B-12 have been changed to conform to the revised designations assigned by the Missouri Archaeological Survey. The letter B has been inserted before the page numbers of this appendix and both have been moved to the center bottom of the page from the upper right corner of the page.

APPENDIX C

INVESTIGATIONS AT SITE 23 CL 279

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INTRODUCTION

Site 23 CL 279 was discovered in June 1979 by GAI Consultants when we were rechecking a locality where Archaic-age artifacts had previously been found. Gene Jenkins found the new site and it is now named after him in addition to having formally been designated by the Missouri Archaeological Survey. Because of the quick discovery of three Nebo Hill points and its eroded, stream-edge physiographic setting, we recognized the potential of the site. We requested two archaeologists to examine and appraise the site. Dr. Dale Henning, University of Nebraska-Lincoln, and Dr. Al Johnson, University of Kansas, visited the site on June 21 and June 25, respectively. Both agree on the need for testing of the site.

Notification of the site's discovery was given to Michael Weichman, Senior Archaeologist, Office of Historic Preservation, State of Missouri, on June 22, 1979. A copy of the site survey form, prepared for submission to the Missouri Archaeological Survey, and photographs of the site were turned over to Weichman and he examined the few artifacts we had collected. He recommended we prepare a proposal to mitigate the impact of the erosional processes on the site for submission to the Corps of Engineers, Kansas City District. Dr. Roger Grosser of that agency was notified about the site and agreed to visit it. He and Camille Avery inspected the site on July 11, 1979.

DESCRIPTION AND PHYSIOGRAPHIC SETTING OF SITE 23 CL 279

Site 23 CL 279 is located about 1.6 miles (2.44 km) east-northeast of Smithville, Missouri, within the newly created Smithville Lake reservoir basin and quite near to the southern end of the new earthen dam. Its legal location is: Clay County, Section 23, Township 53N, Range 33W, NE 1/4 of the SW 1/4 of the NE 1/4. It lies at 39° 23' 37" N. Lat. and 94° 33' 07" W. Long. (Figure 4-1).

The site is situated on the northeastern corner of a low lying spur of land that is located at the juncture of a gulley and the valley floor of the Little Platte River. The elevation of the site on the end of the spur is about 820 M.S.L. and the adjacent gulley and valley floor lies at about 810'. The valley floor immediately north of the site is actually an elongate, east-west trending depression, probably a channel scar representing a former course of the Little Platte River on Crows Creek. To the north of this channel scar, the surface rises gradually to about 817' M.S.L., the first (T_1) terrace. It would appear that site 23 CL 279, when occupied, was located on the bank of either Crows Creek or the Little Platte River. At first glance, the fluvial geometries of this portion of the river and Crows Creek favor the channel scar being a remnant position of Crows Creek. The gulley east of the site must also have existed during the time(s) of occupation since the site runs for some 50 m along the edge of this gulley (see below).

The terrace area north of the channel scar is part of the T_1 terrace system, a series of paired terraces on either side of the river which are tracable throughout most of the length of the Little Platte River. Our investigations lead us to believe that the T_1 terrace is a former floodplain level of the Little Platte River. GAI's archaeological and geological investigations have shown that the T_1 terrace contains many archaeological sites whereas the lower T_0 terrace contains no prehistoric sites. Our interpretation is that the T_1 terrace was probably the floodplain during most of later prehistoric times. This interpretation supports the belief that the channel scar north of site 23 CL 279 was an active channel at the time of the occupation of that site.

The terrestrial context of the site must also be considered in evaluating its age and setting. The valley slope and upland above the site is formed from thick glacial till and glacio-fluvial deposits of the Kansas glacial stage that are veneered with late Pleistocene loess. The relatively low lying position of the site on or adjacent to the valley slope and in close proxmity to an active stream suggest that portions of the site have been buried by alluvial and/or colluvial sediments. The greyish, (?) alluvial sediments from which artifactual remains are eroding contrast strongly with the orangish glacial and buff-colored loessial materials located above and behind them. The uppermost exposed sediments of the site seem to be devoid of artifacts as far as examination of erosional faces can determine at this time. This unit may represent a colluvial layer lying nonconformably above the alluvial sediments from which the artifacts seem to be coming. The possibility of sealed, in situ archaeological materials being located in this site is most intriguing.

The site itself, as defined by the presence of artifacts on the surface, measures approximately 50 meters north to south and 4-15 meters east to west. It occupies a moderately steep to fairly level strip of ground at the northeast corner of a north-projecting spur. The long axis of the site lies along the western edge of a gulley which descends about ten feet below the site. The site hooks around the corner of the spur and broadens out to about 15 meters in this flatter area. The surface of the site, still largely devoid of new vegetation at the time of discovery and early examination, has a considerable quantity of dead brush and trees piled irregularly across the site, the apparent result of the last floods (spring 1979) which covered the site.

Two wave-cut notches are present. The upper one cuts the sediment (?loessial colluvium) above the cultural zone while the second, lower one cuts right through the cultural deposit. These two features provide clear evidence of the results of erosion caused by the changing lake levels of the past spring. This recent erosion is also clearly evident along the spur to the west of the site, across the gulley east of the site, and in other localities within the lower reservoir area (some of which also have artifactual remains appearing from the freshly eroded deposits, e.g. sites 23 CL 271 and 278). The colluvial-alluvial context of the archaeological site was being destroyed by the mechanical effects of wave action of fluctuating lake levels, by localized drainage (micro-gulleying), and rain falling on the exposed, unvegetated surfaces. In addition, clearing the site of arboreal vegetation last fall also probably contributed to its degradation and increased its vunerability to the other agents listed above.

TESTING OF SITE 23 CL 279

The testing program for site 23 CL 279 began on August 27, 1979. Field work continued until August 31. Full time crew members consisted of Marc Collier and Jill Schroeder who excavated all but two 1 m x 1 m test units and one step trench. William McHugh was present at least half of each day and excavated one 1 m x 1 m test unit and a step trench; he also photographed the site, and made observations on site conditions and progress. Gene Jenkins, the site's discover, was present one half day and excavated one 1 m x 1 m test unit.

On August 27, 1979, a dense weed cover enveloped and obscurred the previously established grid-lines. This weed cover was removed by hand along the north-south base line and several meters on either side. When excavation units were positioned farther east and west, weed removal and expansion of the grid system was made as needed.

A datum point from which all elevations were plotted was placed on a high point above the site, southwest of the concentration of artifacts, and assigned an arbitrary elevation of 100.0 m. On August 30, 1979, the level of the impounded water rose several feet after the previous day's rain. Using the elevation of the water obtained from the Corps of Engineers, we were able to add the vertical distance from the water level to our datum and to determine its elevation to be 832.33 feet M.S.L.

A total of eighteen 1 m x 1 m test units were excavated at scattered points on the site (i.e., among artifact concentrations and beyond in order to cover the lateral extent of the site). In addition, two step trenches (Figure A3-1) were excavated. These excavations were conducted by carefully shovel slicing. Each trench and test unit was excavated several centimeters into the clay subsoil. Several times, screening through 1/4 inch mesh screen was attempted but abandoned due to the wet condition of the soil. Each wall was trowelled clean to observe the stratigraphy.

Vertical profiles were made for excavation units N980 E190 and N985 E200 and the main trench. An eroded area afforded us with an easily prepared east-west vertical face along the N974.90 line, between E192.20 and E196.38, across the western half of the site. Continuing this erosional face to the east, a step trench was excavated between E196.38 and E202. The profiles of the erosional face and both walls of the trench were drawn (Figure A3-3). The stratigraphy revealed in the profiles is discussed below.

Before concluding the testing operations, the site was sectioned off in five meter wide strips, aligned east-west. The artifacts on the surface of each unit were collected and bagged. Each of the seven sections was given a letter designation, A through G, from the north to south.

INTERPRETATION OF THE STRATIGRAPHY

One goal in the testing program was to discern the stratigraphy of the site to determine two things: 1) if an intact artifact bearing stratum existed, and 2) the extent of erosion caused by the impounded waters of the Little Platte River.

A quickly excavated 12-meter long step trench several meters south of the N976 line in an erosional gulley revealed that very little top soil remained above the clay subsoil. A more precisely located and carefully excavated trench along the N975 line between E196.38 and E202 was continuous with an erosional face along N974.90 between E192.20 and E196.38 (Figure A3-5). Examination of the erosional face and trench wall revealed what had been suspected; a large amount of soil had been removed by the wave action of the fluctuating water levels. Figure A3-5 depicts the north wall profile of the eroded area and excavated trench. Inspection of the profile along N974.90 between E195 and E195.58 indicates that no less than 48 centimeters of top soil once covered that area and, indeed, probably much of the site. To the east of E195.58 (the area eroded by fluctuations of the impounded water), no more than 10 centimeters of top soil remains. In addition, other mapped excavation units reveal the same picture. In Figure A3-4 (bottom), the south vertical profile of the excavation unit above the eroded surface at N980 E190 shows 40 centimeters of top soil cap the clay subsoil. At N985 E200 (top, Figure A3-4) located on the eroded surface, at most, 13 centimeters of the top soil cap the clay subsoil.

The profile drawings graphically display the extent of soil removal by the impounded waters and other agencies. All the artifacts recovered come either from the surface or from the upper most soil unit, a plowzone with colluvial admixture. No cultural features were observed either in ,e silty top soil or in the clay subsoil.

THE ARTIFACT ASSEMBLAGE FROM SITE 23 CL 279

The artifact assemblage comprises 172 specimens, including prehistoric lithic implements and pottery and historic debris. An attempt will be made to identify the relative age of the pottery and type compi-te lithic specimens; this may make it possible to determine the cultural manifestations on site 23 CL 279. A comprehensive list of artifacts can be found in Table A3-1.

Lithic Debitage

The lithic implements recovered include seven projectile points, one thick, narrow biface, two axes (one fragmentary), and three other bifaces. Unworked artifacts include 123 flakes, 4 utilized flakes, and 21 cores. Table A3-2 gives measurements, chert types, and provenience of all projectile points, the gouge, and axes.

Lanceolate Projectile Points (N=6; Plate 6-3: a, b, d)

Three are complete, two are missing either the base or distal end, and one is roughly reworked. The complete specimens are long, narrow, and thick with convex lateral edges that converge to a point at the distal end and toward the base. Two bases are concave and one convex.

Reworked Specimen (N=1; Plate 6-4:h1)

A single specimen form is lanceolate even though it is shorter, thicker and wider than the others. It has recurved edges converging to a point at the distal end and a narrow rounded base (one basal corner is missing). This specimen's pinkish hue indicates heat treatment. All lanceolate points except the reworked specimen are made from Westerville chert.

Corner-Notched Projectile Point (N=1; Plate 6-1:y).

It is short, wide, and thin. The convex lateral edges lead to a rounded distal end and proximally to moderate barbs. The expanding stem has a convex base. The specimen's pinkish hue is due to heat treatment. The chert type is unknown.

Thick, Narrow Biface (N=1; Plate 6-4:h)

This large, bifacially worked specimen has a rounded distal end and flattened base that served as a striking platform. It is similar to the implement type called the Sedelia Digger (cf. Chapman 1975: Fig. 8-15b and Fig. 8-21d, e).

Ground Stone Axes (N=2; Plate 6-5)

The complete specimen is subrectangular with battered surfaces, ground flat edges, and sharp, smoothly ground distal end. The incomplete specimen appears to be the distal half. The obverse surface and left flattened edge are ground very smooth. The reverse and right flattened edge are also ground but are not smooth. The distal edge is battered. Both specimens are made from diorite.

ARTIFACT COMPARISONS

The latest and most comprehensive study to date on the Nebo Hill complex is that by Kenneth Reid (1978), who reinvestigated the Nebo Hill site (23 CL 11) in southern Clay County, Missouri. The site was discovered in 1946 by J. Mett Shippee who authored a short report with illustrations and descriptions of lithic artifacts recovered from the surface. Larry Schmits (1978:111) also recovered Nebo Hill artifacts from a cultural stratum, Horizon III-8, at the Coffey site, 14 PO 1, in northeastern Kansas. These sources will be utilized in an attempt to determine the cultural affiliation of lithic implements from site 23 CL 279.

Table A3-3 gives direct measurements and figure comparisons of projectile points from site 23 CL 279 to those recovered from 23 CL 11 (Nebo Hill type site) and 14 PO 1 (Coffey site). The mean length of the three projectile points from 23 CL 279 are somewhat shorter than those found at 23 CL 11 and 14 PO 1, but the width and thickness (except for 14 PO 1) means are very close. Page numbers of projectile points from sites compared are supplied to promote visual comparisons.

The corner-notched specimen recovered from 23 CL 279 is similar to corner-notched specimens found at 23 CL 11 and 14 PO 1, although there are some differences in measurements. Two corner-notched specimens from the Coffey site, 14 PO 1, were recovered in the same cultural-stratigraphic stratum (Horizon III-8) as was one lanceolate projectile point and important radiocarbon dates (discussed below). Both lanceolate and corner-notched forms were found at the Nebo Hill site, 23 CL 11, and since it is considered a single component site (Reid 1978), the two projectile point forms may be contemporaneous.

Gouges were not reported by Reid (ibid.), but Schmits (1978:16) reports two from 14 PO 1 (Horizons III-5 and 8).

Neither Reid nor Schmits reports ungrooved axes from their investigations at sites 23 CL 11 and 14 PO 1, respectively. Shippee (1964:13) does report three complete and one fragmentary ungrooved rectangular axe from Nebo Hill sites along the Missouri river. These specimens were found in association with Nebo Hill projectile points.

Radiocarbon dates have been obtained from both 23 CL 11 (Reid 1978:247) and 14 PO 1 (Schmits 1978:85). From 23 CL 11, one date 3555 ± 65 B.P. (UGa - 1332) was obtained from a sample of carbonized walnut shells from Feature 2, a sealed pit below the plowzone. This pit also contained a little lithic material, none of which was positively diagnostic of the Nebo Hill complex. Nevertheless, Reid sees this date as applicable to the Nebo Hill occupation as there are no other cultural components on the site. Larry Schmits (ibid.) reports three radiocarbon dates from unit III-8 of 5285 ± 70 B.P. (Wis-629), 5255 ± 70 B.P. (Wis-636), and 5850 ± 135 B.P. (N-1550). This stratigraphic-cultural unit produced one complete and one partial Nebo Hill point as well as basal and corner-notched projectile points, manos, metates, bifacial knives, and scrapers.

Ceramics

Ten grit-tempered body sherds were recovered from the surface of site 23 CL 279. These have caused some bewilderment since they were found in the context of what appears to be a Nebo Hill Assemblage. The Nebo Hill complex is supposed to predate the appearance of pottery in the general area and although Reid (1978: 181) recovered a small amount of fiber-tempered pottery at the Nebo Hill site, 23 CL 11. Grit-tempered pottery is not known to exist in this area prior to the Early Woodland period (Chapman 1952:141).

Flooding in the reservoir accounts for much of the recent cultural debris on the site.

CONCLUSIONS AND RECOMMENDATIONS

At the time site 23 CL 279 was discovered in June 1979, it had already suffered considerable damage caused by waters temporarily impounded by the Smithville Dam. We believed that the artifacts present on the surface at that time may have been eroding out of a still intact cultural deposit. The testing of the site was planned to determine if intact cultural remains were present, to determine the site's areal extent, and to discern the stratigraphy and the extent of erosion. All were accomplished.

In the areas that had been disturbed by erosion, artifacts were recovered on the surface or in the thin remnants of the plowzone. Along the western margin of the eroded surfaces, the plowzone was clearly demarked in the test pit profiles and a few artifacts were recovered in the plowzone. As previously noted, two flakes and a rusty nut were recovered in a zone 11 centimeters thick in unit N980 E190. They were not associated with any stains or features and the zone probably represents an old plowzone.

Profile maps drawn from various test pits and the step-trench reveal that most, and in some areas, all of the soil above the subsoil clay had been removed by erosion caused, we believe, by the rising and lowering of the impounded water. The lack of in situ cultural remains from site 23 CL 279 and the fact that the clay subsoil was exposed at most places after water impoundment indicate the site integrity had been destroyed prior to test excavations.

It is on the basis of these conclusions that we recommend that no further investigations are needed at Site 23 CL 279.

APPENDIX D

SUPPORTING DATA FOR THE GEOLOGIC AND GEOMORPHIC INVESTIGATIONS, AND DETAILED REPORT OF THE DEEP-TESTING FOR BURIED ARCHAEOLOGICAL SITES

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APPENDIX D-I

CLAY MINERALOGY

An analysis of the clay mineralogy of the deposits of the Little Platte valley and Illinoian Alluvium, Perorian and Bignell from nearby sources, was made to aid in determining the associations between these deposits and their associated landforms. The laboratory analysis was conducted by Dr. James L. Eades, Mineralogist, using x-ray diffraction techniques. X-ray diffraction analysis involves bombarding a prepared soil sample with x-rays at angles that range continuously between about 2 degrees and 70 degrees. The intensity of the x-ray beam being reflected from the sample is measured as it rotates from 2 degrees to 70 degrees in the field of the beam. The angles of the reflected beam are recorded on a graphical readout (diffractogram). The angles at which the peak intensity of the reflected beam occurs are directly related to the crystal structure and molecular spacings in the minerals. Thus, each angle where the reflected beam "peaks" in intensity represents a definite molecular spacing that can be used to identify the clay mineral. Relative quantities of a clay mineral in a soil sample are estimated by comparing peak intensities, or total amount of reflectance from the peaking range for that particular mineral compared to the other clay minerals in a sample. A single sample is tested several times after being treated in several ways to facilitate mineral identification.

Peak heights can also be used to compare clay mineraologies between different samples. The diffraction ratio (D.I. ratio) is a commonly used parameter in comparative clay mineral studies. The D.I. ratio is computed by dividing the height of the peak for Illite by the height of the peak that represents Kaolinite and Chlorite.

The clay mineralogical data was compared in four ways for this investigations, as shown on Figures 3-7 and 3-9. The first three were simply a comparison of:

1. The percent montimorillonite contained in each sample;

2. The D.I. ratios of each sample;

3. The presence or absence of mixed-layered minerals.

The fourth comparative technique was a Factor Analysis of the samples utilizing the percentages of clay minerals in each sample. The Factor Analysis is a statistical manipulation of the data that compares the percentages of clay minerals within each sample with the corresponding percentages of clay minerals in all the other samples.

The clay mineralogical data is summarized on Table D-1. A summary of test pit and boring locational data, and a schedule of sample testing are given on Table D-6 of Appendix D-VII. The location of test pits and other sampling points are shown on Figures 3-1 and 3-2a and 3-2b. A note from Dr. Eades explaining sample preparation is presented on the next page.

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Preparation of Sample for X-ray Analysis

A sample weighing approximately 10 grams was quartered from the sample of wet soil as received from GAI Consultants, Inc. The sample was allowed to soak in 100 ml of distilled water with 20 ml of a 4% solution of sodium and calcium hyperchlorite. After the organic material had been removed the clays were washed with distilled water until the excess Na^{+} and Ca^{++} ions had been removed. The pH was adjusted to 9.4 with NH_4CH to disperse the clay.

Oriented aggregates of the dispersed clay were prepared on glass slides. After the clay had dried one slide of each of the samples was placed in a dessicator with glycol for 24 hours. An X-ray tracing was made from:

1. dried clay aggregate
2. glycol saturated aggregate
3. clay aggregate heated in a furnace for one hour at 450° C.
4. clay aggregate heated in a furnace for one hour at 550° C. using Cu radiation and nickel filter

JAMES L. EADES
MINERALOGIST

APPENDIX D-II

PARTICLE SIZE ANALYSIS

A particle size analysis was conducted on samples from the Little Platte Valley and from nearby sources of Illinoian alluvium, Bignell and Peorian loess. The laboratory analysis was performed at the University of Pittsburgh under the supervision of Jack Donahue. Particle sizes were determined with a pipette analysis which involved placing a measured amount of the soil sample into a 1000 M.L. cylinder with water and mixing it until the entire sample is in suspension; titrating of a portion of the suspended solids with a pipette at specific time intervals and depths (10 and 20 centimeters); determining the quantity of the solids in the titrated liquid by drying and weighing the titrate; continuing the process until most of the solids are settled from suspension. This method relies on the relationship betwesettling velocity and particle density and diameter. The results of the analysis are plotted on particle size graphs that present the data in terms of particle size versus percent (by weight). The particle sizes are presented in terms of their diameter values, and are reported in terms of their d values. The particle size analysis is summarized below.

The particle size data were analyzed in two ways. The first involved determining statistical parameters for each curve that are commonly used for sedimentological analysis. The second was a simple visual comparison of the particle size curves. The visual comparison of the curves provided the most interpretable data. Visual comparison of the curve characteristics of the samples identified four basic groupings based on curve shape and modality. The four groupings were:

1. Unimodal. The entire curve is relatively smooth throughout all size ranges. Several samples from the T_1 terrace deposits fall into this category.

2. Bimodal in the Fine Range. The portion of the curve lying in the fine size ranges (6 to 8 d diameters) shows a fluctuation (bimodality) while the coarse range is smooth. This group contained Bignell and Peorian loess; T_2 terrace shallow soil (loess); a T_1 terrace sample; and the upland glacial drift deposit.

3. Bimodal in the Coarse Range. The portion of the curve lying in the coarse range (2 to 6 d diameter) shows a fluctuation (bimodality) while the fine range is relatively smooth. This group contained a T_0 terrace sample; a tributary T_1 terrace sample above a paleosol; a tributary T_1 terrace sample lying below a paleosol; a T_1 terrace sample in the main Little Platte valley.

4. Bimodal in Fine and Coarse Ranges. Both the fine and coarse portions of the particle size curves are bimodal. This group contained Kansan Till; Illinoian alluvium; a T_2 terrace sample; a T_0 terrace sample; a sample of colluvial soil; and both samples of the deep upland soil having a loess-like appearance.

Using particle size curves for correlation of deposits can be difficult, if not impossible, depending on the type of correlation required.

Particle size and distribution characteristics of sediment depends partly upon the flow regime of the water or air that deposited them. Unfortunately, environments of deposition are so variable, even within the same depositional environment (viz. fluvial) that particle size curves for sediments of similar age and origin can be quite different. Usually only very general categorization of deposits can be made from particle size characteristics, such as distinguishing between fluvial, eolian or lacustrine deposits. Separating the fluvial from eolian deposits might be most easily accomplished since both loess deposits and the shallow upland soil (presumed to be loess) seem to be bimodal in the fine range whereas the fluvial deposits occur in the other categories. However, determining whether or not the T_1 terrace soil contains loess derived deposits is impossible because any loess in the T_1 terrace would have experienced some fluvial transport before it was deposited in the terrace. Therefore, the particle size analysis was not considered to be a strong tool for correlating the various deposits in the valley.

APPENDIX D-III

ANALYSIS OF MICROTEXTURES USING SCANNING ELECTRON MICROSCOPY

Analysis of microtextures on the surfaces of silt sized particles in a deposit is sometimes used to distinguish modes of deposition, and to estimate relative ages by observing the degree of weathering of the particles. Such an analysis was employed in this investigation to aid in deciphering the relationships between the deposits within and surrounding the Little Platte valley. The analysis was conducted by Dr. David Krinsley, mineralogist, using a scanning electron microscope. Krinsley also provided an interpretation of his findings and photographs (photomicrographs) of the surfaces of representative particles from each sample. Further interpretations were made by George Gardner and Jack Donahue, Project Geologists.

Comparisons of surface textures by scanning electron microscopy are usually performed subjectively by simple visual comparisons of particle characteristics. We attempted to quantify the analysis by statistically manipulating the surface texture data provided by David Krinsley and summarized in Table D-2. Our attempts at a quantitative analysis were only marginally successful in establishing clear relationships, perhaps because our sampling spectrum was limited. We found that the simple visual comparisons of the photomicrographs of the surfaces of particles provided the best results.

Our subjective analysis of the photomicrographs was conducted as follows:

1. Ten individuals (three engineers, four geologists, and three artists) were asked to examine six groupings of photomicrographs

representing six samples that included Peorian and Bignell loess, Illinoian alluvium, two T_0 terrace samples, and one T_1 terrace sample. Approximately ten photomicrographs from each sample were grouped together, and the groups of ten were arranged in two rows, three groups to a row;

2. The ten analysts were told to compare the groups and record which were most similar. The groups were simply numbered 1 through 6 and were not identified in any other way.

The results of this comparative assessment are presented on Table D-3. The most common associations made by seven out of ten analysts were:

1. Bignell loess = T_1 terrace;

2. T_0 surface sample = T_0 deep sample;

3. T_0 surface sample = Illinoian alluvium.

These relationships tend to associate the Bignell loess with the T_1 terrace. The association between the T_0 terrace samples and Illinoian alluvium may reflect their common alluvial mode of origin.

APPENDIX D-IV

PALYNOLOGY AND RADIOCARBON DATES

A required component of the geologic and geomorphic investigations tory of the Little Platte valley was a reconstruction of the paleoenvironment. We attempted to obtain a pollen diagram for the Little Platte valley to help reconstruct the paleoenvironment, and we also attempted to recover samples of ancient wood in deposits of the various terraces tc help establish an absolute chronology for the terraces. Pollen and wood are best preserved in sediments that are below the water table and in a reducing chemical environment. Unfortunately, this type of chemical environment is rare in the Little Platte valley, and the best possible locations approximating these conditions and possibly containing wood were believed to be the meander scars.

Several meander scars were sampled using a tractor-mounted backhoe and a "bombadier" mounted drill-rig designed to travel through boggy areas. The analyses of pollen samples and wood from test-trench and boring samples samples were conducted by Dr. James King and Frances King, respectively. Radiocarbon dating was performed by Geochron Laboratories Division of Kreuger Enterprises, Inc.

The only wood and pollen samples preserved well enough for analysis occurred in a T_0 meander scar along Crows Creek (see Figure 3-2b). The samples procurred form the other two meander scars in the T_0 and T_1 surfaces were too oxidized to preserve pollen for analysis, and did not contain enough wood for radiocarbon dating. A radiocarbon date was also attempted on an organic soil (paleosol) and was only marginally successfull because the organic content was very low.

The separate reports of Dr. James King and Frances King regarding the pollen and wood analyses are given on the next few pages. These are followed by two reports on the radiocarbon assays performed by Geochron Laboratories.

Illinois State Museum
Springfield, Illinois 62706 217-785-0571

Quaternary Studies Center

February 21, 1979

PROJECT NO.
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ALS RET. TO

Mr. George D. Gardner
GAI Consultants, Inc.
570 Beatty Road
Monroeville, PA 15146

Dear George:

We have finished the analysis of the buried organic unit from Crow's Creek. [redacted] Pollen was preserved only in the main organic clay between 140 CM and 240 CM. GDG In all we processed 14 samples from this unit at Crow's Creek.

The pollen preserved in these organic clays is dominated by ragweed, up to 77% of the total pollen. The remaining grains where those of Oak, Elm, Walnut, grass, sunflower-types members of Compositae and Sedge. This pollen assemblage occurred throughout this unit and reflects the vegetation that has been present in the Smithville, Missouri area for the past few thousand years. Based on the pollen and our discussions in the field, I do not feel that this deposit is more than a few thousand years old.

The high percentage of ragweed pollen suggests an active floodplain at the site. This interpretation is also supported by the large number of seeds of Potamogeton sp. in the bulk sample from 130-150 CM we cleaned up for radio-carbon analysis. Potamogeton, pondweed, is a submerged aquatic plant that requires rather permanent ponds for its habitat. Such ponds would occur on an active floodplain as sloughs or small backwater ponds. The Sedge pollen, also of a semi-aquatic species, suggests a wet habitat with intermitent water.

The geologic situation at Crow's Creek, plus the stratigraphic sequence, plant macofossils and preserved pollen, suggest to me that the buried organic clay is a slough deposit that accumulated over a relatively short period of time. Nothing in the deposit indicates to me any type of climatic change during its accumulation, which would suggest a long interval of sedimentation. The radiocarbon date from the wood and plant fragments, 130-150 CM, will date the top of this deposit.

The remaining samples from the Little Platte Ox-bow and sites labeled WLP-4 and ELP-1 did not contain any preserved pollen. A total of 13 samples were analyzed from these sites.

I hope these results are of value to your interpretations. It is unfortunate that pollen was not preserved in the other terraces besides those along Crow's Creek.

Mr. George D. Gardner
February 21, 1979
Page 2

Separately I am returning the unused portion of the pollen and wood samples from WLP-4 and ELP-1.

I have enclosed a statement for my time on the project and laboratory expenses.

Sincerely yours,

James E. King

James E. King
Curator of Paleobotany

JEK/gr

Enclosure

Springfield, IL 62706 • R. Bruce McMillan, Museum Director • Telephone 217-782-7386

springfield illinois illinois state museum

GAI CONSULTANTS INC
PROJ NO

PROJECT NO
AMO REG TDD RWB HLD BMM FBN GRT PMW HAS LMO ALS
JAH RJG RBA JDM JWS RVT JAV

February 23, 1979

Mr. George D. Gardner
GAI Consultants, Inc.
570 Beatty Road
Monroeville, PA 15146

Dear Mr. Gardner:

As Jim mentioned to you on the phone the other day, I have finished identifying the wood samples from ELP-1 and WLP-4, and none of them appear adequate for C14 dating. Once cleaned, most of the samples are small are are either roots or appear to be modern.

While I doubt that it is always possible to separate modern and ancient plant materials on the basis of appearance, there are some clues I have come to look for. Old wood generally loses the light color of fresh wood, turning dull and frequently becoming mineral stained. Old wood also loses much of its elasticity, becoming brittle and easy to break. When in the process of identifying wood I break it to expose a fresh cross-section, I can frequently tell if a piece is probably young when it splinters or bends rather than breaks. Some of your samples fall in this category. On the other hand, sample WLP-4, T_2-1, 25' is a good example of a piece of wood that is probably old; it is brittle, dark colored and there are minerals accumlated in the vessels.

Roots age similarly to wood, but an additional problem with them is that they penetrate many feet down and it is impossible to know for sure that they are not more recent than the sediments in which they occur. Grass also loses its flexibility and straw color with age. The grass in several of your samples appears modern and I would guess that it is probably contamination, possibly from bioturbation by crayfish burrowing, etc. However, if you feel that these samples are probably from undisturbed sediments, it might be worth your while to have them dated. I expect they would date quite young. If you wanted to do this, the best samples would be ELP-1, T_1-1, 16.6-16.3 and ELP-1, T_1-2, 12.0-14. These are however quite small samples.

Let me know if you have any questions I might be able to answer for you. I have enclosed a statement for my time.

Sincerely,

Fran King

Frances B. King
Research Associate

FBK/gr
Enclosure

ILLINOIS STATE MUSEUM

Quaternary Studies Center

ANALYSIS OF ARCHEOBOTANICAL REMAINS

C = Carbonized
U = Uncarbonized (but not fresh)
F = Fresh embryo (contamination)

Project GAIE.
Date received 13 FEB 1979
Date completed "

PROVENIENCE		TYPE OF REMAINS	NO.	WGT.	REMARKS
ELP-1	12-14	ROOTLET, PROB. MODERN		<0.1 gram	
T_1-1	14.0	GRASS, PROB. MODERN		0.2	
	16.6-16.3	GRASS, PROB. MODERN		1.5	*
	16.7	NOTHING ORGANIC		–	
	16-18	ROOT		0.1	
ELP-1	18.0	ROOT		8.0	
T_1-1	18-20	ROOT		0.1	
CONT.	19.2-19.5	ROOT		1.0	
ELP-1	14.0	ROOT		1.0	
T_1-2	12.0-14	GRASS POSS. OLD.		0.8	*
	14-16	GRASS		<0.1	
WLP-4	16-18	GRASS, POSS OLD		0.1	
T_2-1	18-20	GRASS, POSS. OLD.		<0.1	
	25	2 YR. OLD WOODY STEM, PROB. OLD.		0.1	
	25.5	GRASS, PROB. MODERN		<0.1	
WLP-4	17.5-19	ROOT, POSS. OLD.		<0.1	
T_2-2	19-21	ROOT POSS. OLD		<0.1	

KRUEGER ENTERPRISES, INC.
GEOCHRON LABORATORIES DIVISION
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PRIORITY BASIS

RADIOCARBON AGE DETERMINATION — REPORT OF ANALYTICAL WORK

Our Sample No. GX-6118 — **Date Received:** 27 December 1978

Your Reference: letter of 19 December 1978 — **Date Reported:** 16 March 1979

Submitted by: George D. Gardner
GAI Consultants, Inc.
570 Beatty Road
Monroeville, PENNSYLVANIA 15146

Project 78-534

Sample Name: Sample ELP-3-15-2. Paleosol.

AGE = No age determined. (See comments below.)

Description: Sample of paleosol 1cm. thick.

Pretreatment: The sediment sample was dispersed in water and eluted to separate the clays and organic matter from any sand and silt. The clay/organic fraction was then treated with hot dilute HCl to remove any carbonates prior to combustion to recover carbon dioxide from the organic matter for the analysis.

Comment: The amount of organic matter in this paleosol is extremely small. The trace of carbon was recovered an we attempted to count it. Inconsistent results between about 4000 and about 12,000 C-14 years B.P. were obtained and the sample was abandoned as too small for reliable results.

δC^{13}_{PDB} = $^{0}/_{00}$

Notes: This date is based upon the Libby half life (5570 years) for C^{14}. The error stated is $\pm 1\sigma$ as judged by the analytical data alone. Our modern standard is 95% of the activity of N.B.S. Oxalic Acid.

The age is referenced to the year A.D. 1950.

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PRIORITY BASIS

RADIOCARBON AGE DETERMINATION — REPORT OF ANALYTICAL WORK

Our Sample No. GX-6311 — **Date Received:** 27 February 1979

Your Reference: letter of 22 February 1979 — **Date Reported:** 16 March 1979

Submitted by: George D. Gardner
GAI Consultants, Inc.
570 Beatty Road
Monroeville, PA 15146

Sample Name: Crows Creek. Wood. 140 cm. level.

AGE = 450 ± 150 C-14 years B.P.

Description: Sample of wood fragments.

Pretreatment: The wood was split into small fragments after removing any obvious dirt, etc. The sample was then treated with hot dilute HCl to remove carbonates, and with hot dilute NaOH to remove any alkali-soluble contaminants present. It was then washed, dried, and combusted to recover carbon dioxide for the analysis.

Comment:

δC^{13}_{PDB} = 0 oo.

Notes: This date is based upon the Libby half life (5570 years) for C^{14}. The error stated is $\pm 1\sigma$ as judged by the analytical data alone. Our modern standard is 95% of the activity of N.B.S. Oxalic Acid.

The age is referenced to the year A.D. 1950.

APPENDIX D-V

PALEONTOLOGY OF TERRESTRIAL GASTROPODS OF THE LITTLE PLATTE VALLEY

Reconstructing the geologic, geomorphic, and paleoenvironmental history of the Little Platte valley required an examination of the terrestrial gastropods (land snails). Terrestrial gastropods are very sensitive to climate and their presence in soil deposits, particularly loessial soils, can greatly aid paleoenvironmental reconstructions if the soils are old enough and the snails sufficiently preserved. Dr. H. B. Rollins of the University of Pittsburgh conducted the field and laboratory analyses of the terrestrial gastropods in the Little Platte valley. His report is presented on the next few pages.

MOLLUSCA

H. B. Rollins

INTRODUCTION

Terrestrial molluscs, especially pulmonate gastropods, have proven very useful in recognition of micro-habitats associated with archaeological sites. Pulmonates are useful as indicators of subtle spatial and temporal environmental variation. As such, they complement pollen analysis in archaeological research since the latter has proven to be valuable in the assessment of changes in climate, regional rainfall, etc. Since pulmonate gastropods are rarely preserved in other than calcareous soils, they are often not found with pollen which is most effectively preserved in soils below pH 5.5 (Dimbleby and Evans 1974). In calcareous soils, such as those developed upon Pleistocene loess deposits, the preserved molluscan assemblage changes slowly through the stratigraphic section, whereas the pollen may reflect only the latest ephemeral ecological conditions (Dimbleby and Evans 1974).

The ecological factors that most affect pulmonate distribution are humidity, temperature, and food. In addition, lime content of the soil is important and calcarious habitats usually have the most diverse and abundant land snails (Evans 1972). Variation in the moisture content of the environment is a primary factor in creating the spectrum of nonmarine molluscs readily assignable to freshwater, marsh, woodland, and xerophilous species. Most species of pulmonates are scavengers and carrion feeders. Woodland species prefer fungi, but no land snail has been observed to be restricted to a single plant species for food. Some pulmonates (e.g., the Zonitidae) are carnivores. Available food cannot usually be considered of major importance in the abundance and distribution of pulmonate faunas (Evans 1972).

The land snails of North America can be divided into two major provinces: The eastern province extends from the Atlantic coast to the Rocky Mountains and exhibits remarkably little endemism. Pulmonate species are generally very wide-ranging in both space and time within this eastern province (Burch 1962). The Great Plains region, in particular, contains a very conservative pulmonate fauna. This is also the area within North American where we have the most detailed knowledge of pulmonate molluscs (Taylor 1965). The western province, on the other hand, is highly fragmented by locally endemic faunas.

Although pulmonate diversity may have decreased slightly from the Pleistocene to the recent, "so far as fossil shells can demonstrate, nearly all species of molluscs have remained unchanged throughout the Pleistocene" (Taylor 1965: 598). This places a severe limitation upon the use of pulmonates in working out details of Pleistocene stratigraphy. However, some workers (e.g., Pauken 1969) have been able to use these snails in part, at least, to distinguish loess deposits of different ages. In contrast, long species ranges enhance the value of applying the "transferred ecology" approach. We can be moderately confident in inferring the microenvironments of the subfossil pulmonates by studying their recent distributions and habitats.

PURPOSE OF THE STUDY

Pulmonate snail analysis was employed in this project in an attempt to:

1. Unravel the stratigraphy of the Pleistocene through recent terrace deposits and, in turn, aid in the prediction of "archaeologically-sensitive" sites along the Little Platte River in the area of Smithville, Missouri;

2. To establish a method for the identification and prediction of those micro-environments adjacent to the present-day Little Platte River that would have been most hospitable to Paleo-Indian occupation and, thus, "likely" sites for future archaeological investigations; and

3. Recognize and pinpoint these "likely" sites in the Pleistocene record of the region.

Subsequent sections of this report will demonstrate that these initial goals were only partially attainable, largely due to the lack of preserved Pleistocene molluscs within the study area.

METHODS OF INVESTIGATION

During a three day field visit in November, 1978, samples for molluscan analysis were collected from ten exposures of Pleistocene to recent sediment (alluvium and possible loess) in the area of the Smithville Reservoir project along the Little Platte River in northwestern Missouri. The sample sites were selected in order to include a wide range of depositional environments along the Little Platte River (oxbow muds, alluvial silts and sands, presumed Pleistocene loess deposits) and from a variety of elevations in order to include terraces of different ages (Late Pleistocene to recent). Figure 3-2b and Table D-4 provide for the location and description of the sample sites.

The diversity of exposure conditions prevented a uniform sampling style or a uniform sample size. Samples, therefore, varied from surface picks and surface "scrapes" to bulk samples (see Table D-5). In the cases of bulk sampling and surface "scrapes", care was taken to accumulate enough sediment for valid statistical comparisons of the contained molluscan fauna. Approximately 1.0 kg is considered to be sufficient (Evans 1972). A total of 373 individuals were collected, identified, and evaluated. Although this is a rather small number of specimens, it is of adequate size for determination of the general composition of a fauna. Evans (1972) estimates that between 150-200 shells are sufficient for this purpose.

Field samples were taken to the paleontological laboratory at the University of Pittsburgh where they were treated with a mild defloculant and then wet-sieved through a series of graded seives from 2.0 mm to 0.2 mm. The smallest seive grade used was sufficient to retain even the smallest pulmonates. Prior to wet-sieving, samples were air-dried and weighed.

The sieved samples were then dried under infra-red lights and contained molluscan specimens were identified using standard references and keys (e.g., Pilsbry 1940, 1946, 1948; Bruch 1962, 1975a, 1975b). Ecological information was obtained from a variety of sources, such as Pilsbry (1940) and Pauken (1969, 1971).

RESULTS

A total of 373 molluscan specimens were collected and identified. These were assigned to 30 species (see Table D-5). The number of individuals per sample was far below the average for loess deposits along the Missouri River. Pauken (1971) reported an average of 1,000 specimens per cubic foot sample (this was based upon 217 samples from 67 outcrops of loess). However, a diversity of 30 species was not basically incompatible with the results obtained by Pauken, since he reported a total of 53 species. Pauken's study involved a much larger geographic area and much more extensive sampling and, thus, might be expected to provide greater species diversity.

With a single exception, the molluscan species recovered in this study have been reported extant in the prairie regions and deciduous woodlands of western Missouri. All of these species were reported by Pauken (1969, 1971) from loess deposits along the Missouri River. Three specimens of Carychium exile canadense were found at locality SCB1 (Tables D-4 and D-5). This species is thought to be restricted at the present time to latitudes north of Missouri but has been reported in Pleistocene loess deposits of Missouri (Pauken 1969). As suggested earlier, the conspecificity between the molluscan fauna collected from the Smithville reservoir area and the fauna from Missouri River Pleistocene loess deposits is not unusual and does not permit age assignment of the Smithville sediments. The only suggestion of

Pleistocene age for any of these deposits is provided by the occurrence of Carychium exile canadense. This may indicate that sample SCB1 contained some Pleistocene age sediment, possibly reworked and redeposited from an adjacent loess depost. The subsurface SCB1 sample contained no molluscs (see Table D-5).

Perhaps more significant is the sparcity of molluscs in all but the upper surface of the collected exposures. Wherever bulk samples were collected at intervals below a one inch depth, they were found to be virtually devoid of molluscs [see Table D-5, Samples SCB1 (1-6), SCB1 (6-10), MBS1 (1-6), and MBS1 (6-10)]. This suggests that these samples were not taken from loess deposits but rather from alluvial and/or colluvial sediments along the Little Platte River terraces. Moreover, numerous backhoe trenches were excavated during this study and in only one case were molluscs collected in the subsurface. That single exception was the site of a buried historical refuse pile. Snails had probably congregated around the refuse and were buried along with the various pieces of human debris.

The diversity and taxic composition of the molluscan association is basically compatible with a recent fauna occupying that region of Missouri where there occurs sporadic exposures of limestone bedrock (in this case, Upper Pennsylvanian age limestones). In order to check the composition of the recent molluscan faunas, a collection of living snails was made at locality CB1 locality M-7 on (Figure 3-2b). Specimens were difficult to collect in the forest litter and only two species were recovered, Anguispira alternate and Stenotrema hirsutum. These are common elements, also, of the analysed samples shown in Table D-5. At most sample localities, the pulmonate snails displayed a rather low diversity compatible with a short-term patchy distribution and moreover, traces of periostracum were often found on the shells, also indicative of recently dead individuals. A multigeneration, time-averaging effect, which would lead to a moderately homogenous species distribution pattern, could not be discerned.

Different micro-environments were suggested by the molluscan analysis. Most noticeable was the change in species composition associated with the oxbow (or meander cutoff), locality CCOX (Table D-4 and D-5). The presence of Spaericean clams and the snail genus Physa clearly attest to the riverine/ lacustrine aspect of samples from this locality. The diagnostic fauna provides a powerful tool for the recognition of ancient river patterns, and can be an excellent field check to the use of aerial photos for determination of former river patterns. In context of archaeological research and site selection, this technique should prove useful in the identification of former river bluffs (along the outside of meanders) which were often favored habitation sites.

The most common micro-environment indicated by the Smithville samples was that of the prairie-forest ecotone. According to Pauken (1971), species commonly found in this environment include Anguispira alternata, Gastrocopta spp., Helicodiscus parallelus, Helicodscus singleyanus, and Stenotrema hirsutum. The prairie forest ecotone association is common throughout western Missouri, marking the influence of the prairie peninsula upon the oak-hickory forest uplands. The relatively high diversity exhibited by the total fauna collected in the Smithville reservoir region probably reflects this ecotonal enrichment.

There was, in the sampled localities, no clear indication of a typically uplands forest fauna in the sense of Pauken (1971). Such a fauna would be more frequently encountered in eastern Missouri deciduous forests, well away from the praire influence. Certain common elements of the uplands forest fauna, however, were encountered in some samples. For example, *Succinea* spp. and *Strobilops labryinthica* were noted at localities SCB1, MBS2, MBS1, and TR-1 (Tables D-4 and D-5). Although there were too few recovered specimens for confident prediction, this suggests that these localities were possibly more heavily and extensively forested regions adjacent to the Little Platte River or its tributaries. Reference to Figure 3-2b shows that all of these localities are very close to tributaries as opposed to the more open (less forested) areas some distance away from river channels. Even though the reservoir region has been bulldozed in preparation for construction, occasionally *in situ* tree trunks provide corroborative physical evidence of the former existence of forested regions adjacent to the river.

Once again, it appears that detailed molluscan analysis can provide an effective and subtle tool for the inference of ancient microenvironments. It is possible, when terrestrial molluscs are preserved, to rather clearly separate floodplain and valley floor deposits, wooded bluff areas and more open upland regions. A careful spatial and temporal study of fossil molluscs would permit tracing of former river patterns and the pinpointing of likely archaeological sites along river bluffs. This study, although it established the efficacy of molluscan analysis for archaeological site selection, was hampered by the lack of preserved Pleistocene fossils, possibly in turn due to the virtual absence of thick loess deposits in the study area. The analyzed specimens were generally interpreted to be recently dead individuals, probably the result of extensive bulldozing in the region.

SUMMARY OF RESULTS

1. Virtually all collected molluscs were considered to have died recently and are not representative of a Pleistocene fossil record.

2. This suggests the absence of extensive loess deposits along the margins of the Little Platte River within the study area.

3. Molluscan analysis, therefore, provided little help in unraveling the Pleistocene stratigraphy of the region.

4. On the other hand, the efficacy of molluscan analysis for the identification and predication of potentially "sensitive" archaeological sites was demonstrated since the collected molluscs could be used to detect subtle variations in the habitats along the Little Platte River.

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APPENDIX D-VI

DEEP TESTING FOR BURIED ARCHAEOLOGICAL SITES

Approach and Constraints for Deep-Testing

The geologic and geomorphic investigation provided the general landform locations where depositional processes dating from the late

Pleistocene to the present may have buried archaeological sites, as well as the locations where sites would not be expected. A limited deep-testing program was undertaken to test localities using a tractor-mounted backhoe. The landforms where depositional burial of sites might occur based on the geomorphic model are:

1. Lower valley slopes and foot-slopes where burial may have been accomplished by colluviation, particularly during the Early Man through Archaic periods. Included within this category are colluvial "cones" eminating from small, ephemeral tributary swales and gullies, and general colluvial soil accumulations on lower slopes.

2. Meander scars in the T_1 terrace, both within the meander scars and on their margins where natural levee (like) deposition may have occurred.

Approximately 25 physiographic locations falling into one of these categories were identified by terrain analysis using stereographic aerial photographs. Locations were selected without regard to previously identified archaeological sites. These 25 localities were then reduced to 9 localities, a number that was estimated to be the maximum number that could be tested in the 3 to 4 day excavation program. The 9 localities were selected on the following basis:

1. Physiographic Form - It was deemed desirable to test as many as possible of the various physiographic forms that had potential for site burial.

2. Site Aspect and Position - The aspect and position of the sites (e.g., proximity to water, bluffs, ridges, interfluves; degree of shelter offered by topography; position on main stream versus tributary; edaphic associations) were not major inputs in site selection since such a study would be beyond the scope of this investigation. However, some consideration was given to site aspect and position when selecting the sites targeted for testing. For example, localities on Rock Branch and Linn Branch tributaries were selected partially because they occurred in areas where the main valley of the Little Platte changed from a wide valley bottom to a narrow valley bottom; proximity to the main river was also a consideration.
3. Physical and Contractual Constraints on Testing -The following are some of the physical constraints that had to be considered in selecting the 9 localities targeted for testing:

    a. Testing must be limited to the area impacted by the reservoir and attendant construction. This is essentially the area of the valley below the elevation of 880 feet (MSL).

    b. Since only 3 or 4 days were allotted for the deep test survey, and the survey was to cover as many physiographic locations over as wide an area as possible, test areas should have fairly easy, quick access not requiring extensive clearing or road improvement.

c. Ground conditions and weather conditions (rain) may severely limit the locations that could be tested by making them inaccessible to backhoe. For example, the T_0 terrace is often too saturated to maneuver a backhoe without getting stuck, even when the weather is relatively dry. Also, testing in the main river channel was impossible with a backhoe due to the steep, muddy river banks.

d. Property ownership and/or land use (e.g., crops) limit access and/or the ability to excavate test pits.

e. Extensive geologic logging of soil profiles of the type performed in the geological test pit investigation could not be performed during this phase of the investigation because the primary purpose was to locate buried sites and preparation of detailed soil profiles would be too time consuming. However, test pits containing new or other information that would aid the geologic interpretations would be logged. In addition, test pits containing buried cultural material would be logged in sufficient detail to determine the geologic and archaeologic context of the site. An archaeologist was present during all deep-testing excavations.

DEEP TESTING RESULTS BY LOCALITY

Locality I

Location:

SE 1/4, Sec. 19, T54N:R32W

UTM Coordinates: 1,204,500N:491,000E (approximate cencenter of area)

C.O.E. Air Photographs: LPSP 1-169 and 1-170, dated 4-9-75

Figure Number: 3-2a and 3-2b

Physiographic Setting: Locality I includes riverine morphological forms on the T_1 to T_0 terraces. The locality contains a meander scar on the T_1 terrace to T_0 terraces. The locality contains a meander scar on the T_1 terrace which is of T_1 age. Potential areas of burial on this scar, and the former outside bank of the river where natural levee deposition may have occurred. The locality also contains an area of the T_0 terrace that can be easily accessed with a backhoe and provide an opportunity to examine the soils and test it for archaeological materials.

Test Pits 83 through 105 were excavated at Locality 1. (Test Pits 1 through 82 were excavated as part of the geologic investigation.) Test Pits 83 through 89 were excavated on the former T_1; 90 through 93 were excavated within the meander scar of T_1 age; 94 through 101 were excavated on the former river bank (natural levee if present) of the T_1 age river; 102 and 103 were excavated on a gentle slope between the T_1 and T_0 terraces; and 104 and 105 were excavated on the T_0 terrace.

The potential modes for burial of archaeological sites includes depositional processes on the point-bar natural levee, and within the meander scar during T_1 times. Since geomorphic models predict that the T_1 terrace is believed to be older than the Archaic, archaeological sites would not be expected to be deeply buried.

Summary of Test Pit Data

Test Pits 83 through 89 on the former point-bar were taken to a depth of 2.7 to 3.3 meters deep. All the test pits were sterile of cultural material even though cultural material, including chert core and flakes, had been recovered from the surface (plow zone) of this area. The soils in the test pits were mainly gray-brown to brown clayey silts to silty clays typical of those observed on the T_1 terrace during the geological testing program.

Test Pits 90 through 93, within the meander scar, were excavated to 4.7 meters deep and were also sterile. No surficial cultural material was found in this area. Test Pit 92 was located on the same exact location as a boring that was drilled earlier to procure pollen samples. While being drilled, this particular boring behaved as if rocks were being penetrated between about 2.5 to 4 meters deep, which was considered a possible indication that cultural material was encountered since rocks were not expected naturally at that depth. However, the augers used to drill the soil were malfunctioning during drilling and may have produced behavior similar to that of an auger penetrating rock, and the test pit indicated no rock occurrence within the meander scar.

The soils within the meander scar were a gray-brown clayey silt grading to a very fine sandy silt at about 1.5 meters on the point-bar side of the meander scar (Test Pits 90 and 91). The soil stratigraphy in Test Pits 92 and 93 located at the thalweg and outer portions of the meander scar were somewhat different with gray-brown to brown clayey silt in the upper 0.5 meters, underlain by a dark gray-brown silty clay (gumbo-like) from 0.5 to about 1.4 meters, followed by weakly mottled gray-brown clayey silt to silty clay. This soil stratigraphy is typical of T_1 soil observed in the geological testing program.

Test Pits 94 through 103 were excavated along the outside bank (natural levee) of the meander scar, with Test Pits 99 through 103 located on, or near a high bank of the present river, while Pits 94 through 98 were farther back from the present location of the river bank. Test pits were excavated to a depth of 2.7 to 3.3 meters. Surficial cultural material was found in the vicinity of Test Pits 99 through 103 while none was found in the vicinity of Test Pits 94 through 98 (farther from the present bank of the river). All test pits were sterile.

Test Pit 98 was excavated in an area where about 0.5 meters of recent fill was spread over an area about 30 meters wide and 70 or more meters long, located about 30 meters west of the high bank of the river. The fill looks very much like the natural ground except it is sparsely vegetated and does not appear on 1975 Corps of Engineers aerial photographs. The fill contains numerous chert flakes and or core, and a point was recovered from its surface during the geological testing program in 1978. The source of the fill material is unknown.

Test Pits 104 and 105 were excavated to depths of 4.7 to 5.3 meters on the T_0 terrace. The terrace is very narrow at this location and could be of very recent age. No surficial cultural material was found in this area of the T_0 terrace. The soils were distinctly sandier than those of the adjacent T_1 terrace, ranging from gray-brown sandy silt to clayey sandy silt with no apparent, to very little pedological soil development (no distinct "B" horizon). These test pits were sterile and no prehistoric cultural material was found on the ground surface.

Locality II

Location:

NE 1/4, Sec. 19, T54N:R32W

UTM Coordinates: 1,206,00N:491,300E (approximate center of area)

C.O.E. Air Photographs: LPSP 1-168 and 1-169, dated 4-9-75

Figure Number: 3-2a and 3-2b

Physiographic Setting: Deep-testing survey Locality II is an old channel scar of the Little Platte River on the T_1 terrace. The channel scar has been dissected by drainage of Linn Branch and a small, unnamed tributary so that only a small portion of the channel scar remains. Potential areas of burial are similar to those mentioned for Locality I and include the former banks (natural levees) and the area within the channel scar.

Test pits 106 through 113 were excavated at this locality. Test Pits 106, 107, 108, 110, 111, and 112 were excavated along the position of the former banks of the channel (natural levee). Test Pit 109 was excavated within the channel scar. Test Pit 113 was excavated on a small peninsula of the T_1 surface near the edge of the banks extending down to the T_0 terrace of Linn Branch and the unnamed tributary.

Summary of Test Pit Data

All of the test pits were excavated to depths of 3.3 to 4 meters and all were devoid of cultural material. Some surficial cultural material, a few chert flakes and a core, and a quartzite hammerstone were found, but nothing was recovered below the plow zone.

Locality III

Location:

NE 1/4, Sec. 19, T54N:R32W

UTM Coordinates: 1,207,000N:490,500E (approximate center of area)

C.O.E. Air Photographs: LPSP L-168 and 1-169, dated 4-9-75

Figure Number: 3-2a and 3-2b

Physiographic Setting: Locality III includes the valley morphological forms of an alluvial cone developed on the T_1 terrace and a colluvial foot-slope on a meander scar in the T_1 terrace, but slightly above the T_0 terrace, both along Linn Branch approximately 600 meters from the confluence with the Little Platte River. The alluvial cone is a somewhat subtle feature at this location, emanating from a small gully on the east valley wall of Linn Branch.

The colluvial foot-slope is located about 130 meters upstream from the alluvial cone, and is situated on a small terrace that is at a lower elevation than T_1 but slightly above the T_0 terrace. The foot-slope is somewhat protected by topography since it is in a small, alcove-shaped area that is formed by a meander scar in the T_1 surface.

Test pits 114 through 130 were excavated at Locality III. Test Pits 114 through 122 are located on the alluvial cone that emanates onto the T_1 terrace. Test Pits 123 through 127, and Pit 130 are located on the colluvial foot-slope, with Pits 123 and 124 located on the foot-slope of the T_1 terrace, and Pits 125, 126, 127, and 130 located on the colluvial foot-slope. Test Pits 128 and 129 were excavated within the T_o terrace to examine the soil stratigraphy of this terrace and check for buried archaeological sites.

Summary of Test Pit Data

Test pits excavated in the alluvial cone did not contain cultural material, although a few chert flakes were noted on the surface. The soil stratigraphy in the test pits appears to be aggradational in nature with a yellow-brown clayey silt to silty clay containing a few pebbles and limestone fragments in crudely stratified zones (interpreted as being washed-in from the gully) overlying a more loessial appearing silty clay similar to the soils observed in the T_1 terrace at other localities. The upper colluvial zone is about 110 centimeters thick in Test Pit 115 and pinches out farther downhill. The alluvial cone has a moderately developed "B" horizon of yellow-brown, moderate to strongly blocky (fine to medium sized blocks) soil structure with clay coated soil peds. At Test Pit 118, which is farther downhill, the "B" horizon is distinctively different with the occurrence of precipitated salts in the upper portion of a dark gray brown silty clay (gumbo-like) which is typical of the T_1 terrace soils in other areas of the valley. This "B" horizon pinches out in the uphill direction and becomes thicker downhill. This is interpreted as a distinctive soil profile difference between the T_1 terrace and the alluvial cone. The fact that no distinctive buried pedologic profile could be detected between the alluvial cone and the terrace in test pits that penetrated the cone seems to indicate that no major hiatus occurred between the formation of the cone and the T_1 terrace. The cone was formed at nearly the same time as the T_1 terrace, although it has continued to aggrade since that time.

Test Pits 123 through 127 and Pit 130 were excavated in the colluvial foot-slope, and cultural material was encountered in some of these pits. Test Pit 123 was excavated at the base of the slope near the alluvial cone, and a "worked" flake of chert that appeared fired, occurred at a depth of 50 centimeters in this pit. The pit was excavated in the woods, hence, there was no plow zone. The flake occurred 30 centimeters below the contact of the 20 cm thick humus zone ("A" horizon of the soil). The underlying soil that contained the flake consists of brown clayey silt with a trace of small rock fragments and a weak, fine blocky soil structure. The mode of burial is postulated to be primarily colluviation from the slope. No other cultural material was found in this or Pit 124 which was excavated nearby. Some chert flakes and a core were found on the small roadway (which was slightly excavated) near these pits.

Test Pit 125 encountered fired-rock (mainly limestone) which, upon further excavation, revealed a circular feature composed of cobble-sized, fired rock approximately 1.5 meters in diameter. The depth of the rock-feature ranged from about 35 to 50 centimeters below ground surface. A grit-tempered pot sherd was recovered from within the hearth, and chert flakes, a chert core, small calcined bone fragments, a few fired-rocks, and small particles of fired clay and charcoal occurred outside the feature in the soil of the same stratigraphic horizon. Pit 130 encountered similar materials at the same soil horizon, except no rock feature was encountered. Since this area contains an apparent cultural feature it will be discussed in more detail in the following section.

Test Pits 126 through 129 contained no identifiable cultural material. Test Pits 126 and 127 were located at the foot-slope and had a soil stratigraphy similar to Pits 125 and 130, excluding the cultural material. Pits 128 and 129 were excavated in the terrace adjacent to the foot-slope. The terrace soil was mainly dark brown, faintly mottled dark yellow-brown clayey silt with a weakly developed, medium blocky "B" horizon from 20 to 90 centimeters. The soil was similar to T_0 type soils observed in the geological testing program.

Archaeo-Geologic Context of Locality III

The circular fired-rock feature, identified by the archaeologists as a hearth, is considered a "buried" site since it occurs below the plow zone. Under the direction of the archaeologist, the feature was excavated. No cultural materials were found in the overlying soil nor in the soil cleared from the space between the rocks, however, a grit-tempered (Woodland) potsherd was found at the base of the rock feature. The soil horizon containing the rock feature was briefly examined outside the feature, as well as a similar soil horizon occuring in Test Pit 130 located about 15 meters north of Pit 125. As previously mentioned, this soil contained a few chert flakes and a core, flecks of charcoal and fired clay, fired rock, and small fragments of calcined bone. Such materials have not been found in the various natural (not altered by man) geologic environments tested during the geological testing program. Therefore, this soil has been tentatively identified as a midden since the materials contained within them do not seem to have a natural counterpart in the valley.

The geology of the site is interpreted as follows: the hearth site is located in a small, topographically sheltered position with slopes rising behind and on its north flank. The site is located on the flank of a T_1 terrace meander scar. The soil stratigraphy indicates that the hearth is located on what appears to be a thin veneer of fine-grained alluvial overbank deposits mixed with colluvium that overlie colluvial soils of the hillside. The soil covering the midden in Test Pit 130 becomes thinner in the upslope direction, which is the expected depositional pattern for combined alluvial and colluvial processes of sedimentation on a slope. The hearth and midden zones lie slightly lower than the T_1 surface downstream from the site. The hearth was probably located on the bank of Linn Branch during T_1 time because this stream appears to have flowed by this location at sometime in the past (as interpreted by terrain analysis of aerial photographs). However, it was impossible to determine if the stream flowed by this position at the same time the hearth was constructed and used.

Locality IV

Location:

SW 1/4, Sec. 16, T54N:R32W

UTM Coordinates: 1,208,750N:497,400E (approximate center of area)

C.O.E. Air Photographs: LPSP 1-95 and 1-96 dated 4-9-75

Figure Number: 3-2a and 3-b

Physiographic Setting: Locality IV is located on an east and south facing colluvial foot-slope that is formed on the T_1 terrace. Some testing was implemented on the upland above the slope and the bank of the T_1 terrace in order to determine the soil stratigraphy and to check for buried archaeological sites. The present location of the Little Platte River is about 100 meters to the east of the area, and its position since T_1 time does not appear to have changed very much from that position.

Test Pits 131 through 137 were excavated at Locality IV. Test Pits 131 and 137 were excavated near the crest of the upland. Test Pits 132, 134, 135, 135A, and 136 were excavated in the colluvial foot-slope, and Test Pit 133 was excavated in the bank and surface of the T_1 terrace.

Summary of Test Pit Data

Test Pits 135, 135A, and 136 encountered buried cultural materials while the others were sterile below the plow zone or humus ("A" horizon) zone in the soil (note: chert flakes were found at 20 centimeters or less in Test Pits 132 and 133). The buried cultural material was encountered in what has been tentatively identified as a midden, with cultural materials occurring at depths ranging from 22 to 80 centimeters. The original ground surface may have been 10 to 30 centimeters higher because a small farm road was excavated in the foot-slope, making the depth of burial even greater. The cultural material encountered in the tentative midden included: a large chert point at a depth of 25 centimeters (within the top of the midden); an apparently worked, fired piece of sandstone at a depth of 70 centimeters; a possible chert scraper at 55 centimeters; and sparse chert flakes and core, flecks of fired clay and charcoal, a few fired rocks, and small fragments of calcined bone all found at various depths between 22 and 80 centimeters. Since this location may contain a significantly thick midden, and the absence of pottery and its geologic location indicate that it may be the locus of an early site, it will be discussed in more detail in the next section.

The general geology of this location is as follows: the east facing slope (Test Pits 132 and 134) is composed of a veneer of humus from 0 to 20 centimeters that is underlain by sandy silt to silt with a few rocks extending to depths of 30 to 50 centimeters. The soil below 30 to 50 centimeters is glacial till. Hence, the soil above glacial till is fairly thin and the colluvial foot-slope has not accumulated a thick soil sequence on the east facing slope. The east facing slope passes onto the T_1 terrace (Test Pit 133) whose soil stratigraphy is similar to that on the T_1 terrace at other locations in the valley.

The geology of the south facing slope is quite different from that of the east facing slope. The upland and upper slope is composed of a thick (greater than 140 centimeters) clayey silt loess deposit and not glacial till. The upper 10 to 30 centimeters may have been removed for the farm road at the foot of the slope. Below that, a layer of yellow brown clay silt extends from present ground surface to about 40 centimeters and is interpreted to be a colluvial soil. This is underlain by a hard, dark gray-brown silty clay having a weak block structure and containing sparse amounts of chert flakes and core, fired rock, a possible sandstone tool, flecks of fired clay and charcoal and calcined bone. A chert point was embedded in the top of this soil strata. This soil is believed to be a possible midden zone and it lies between 40 and 100 centimeters below the farm road surface. The soil pinches-out both in an upslope direction and as it passes out onto the T_1 terrace. The dark gray-brown "midden" is underlain by clayey silt that shows the possible vestiges of a "B" horizon structure since it is a medium gray mottled red-brown with moderate to strong blocky soil structure between 100 and 120 centimeters, and a medium gray mottled yellow-brown color with massive structure below that depth. The soil beneath the dark gray-brown appears to be equivalent to the T_1 terrace soils observed elsewhere in the valley.

Archaeo-Geologic Context of Locality IV

The geologic origin of the dark gray soil, tentatively identified as a midden, is difficult to ascertain. It does not appear to be strictly colluvial since no similar soil occurs upslope. It is similar to a backwater river deposit in appearance, however, the soil extends up the lower quarter of the hill slope and pinches out as it extends onto the T_1 terrace. Therefore, the soil does not appear to be alluvial in total, as its geometry suggests a colluvial origin.

The dark gray-brown soil does not appear to be a simple catena of the slope, upland and terrace soil sequence. If the soil is a midden, perhaps its characteristics are influenced by man's alteration of the soil chemistry and texture. Since the cultural nature of this soil was in question, total phosphorus and pH chemical tests were made. High phosphorus contents are sometimes indications of contamination by man's occupation. Total phosphorus chemical tests were run on a total of 14 soil samples, in profile, from test pits 135 and 136. The results were negative for phosphorus (less than 0.001%), however, the pH of the soil was about 5.3 to 5.6 which is marginal for the preservation of phosphorus. At this range of pH, phosphorus can be soluble and removed from the soil by leaching. In addition, similar total phosphorus tests performed on soils from known archaeological features in other parts of the valley were also negative, so that the apparent lack of phosphorus in soils does not rule out possible cultural affiliation.

Locality V

Location:

SW 1/4, Sec. 9, T54N:R32W

UTM Coordinates: 1,214,000N:498,700E (approximate center of area)

C.O.E. Air Photographs: SVM 1-178 and 1-179, dated 5-24-66

Figure Number: 3-2a and 3-2b

Physiographic Setting: Locality V is the farthest north (upstream) locality tested in this survey. It is located in an area where the main mode of deposition is believed to have been a combination of loess deposition and colluviation, with colluviation continuing after loess deposition had ceased. The area contains what appears to be a very old meander scar that may be T_1 or earlier in age.

The topography is somewhat subdued at this location and has not been dissected to T_0 terrace levels by tributary gullies as have the loessial/colluvial soils in downstream portions of the valley. Therefore, the surface at this location is believed to be T_1 in age, and the geomorphic model predicts that site burial should not occur here and all cultural periods should be represented by materials in the near surface soils. The mode of burial that is being tested at this locality is simply deposition by very local mobilization and redeposition (colluviation) of the silty soils.

Test Pits 138 through 145 were excavated in this locality. Test Pits were located where numerous chert flakes and core were collected from the ground surface, which had been plowed several days before. This deep-testing locality was near Archaeological Sites 23CI39 and 23CI37 reported to contain materials ranging from Nebo Hill to Steed Kisker in cultural affiliation (Obrien, 1977). Hence, it was deemed an excellent area to test the possibility of burial by local on-going redeposition of the silty soils through colluviation.

Summary of Test Pit Data

Although the locality had abundant surficial indications of occupation in the form of chert flakes and a core and fired rock, the test pits were all sterile of cultural debris. The soils consisted mainly of yellow-brown to brown clayey silts that have a very loess-like appearance. Slight catena changes were noted in soil profiles between test pits at the tops of small hills (Test Pits 138, 143, and 145) and those on the gentle slopes at the base of those slopes.

Conclusions regarding the presence or absence of buried cultural materials based on only seven test pits should be regarded as tenuous, at best. However, the presence of both Nebo Hill and Steed Kisker materials in the near surface (plow zone) seems to indicate that deposition by colluviation of the soils at this locality has not been a significant process since the Nebo Hill period. No doubt there are some very localized areas where deposition may have buried a site; however, such burial has not occurred on a widespread basis at this locality. The implication is that the slopes are too gentle at this time to create the tractive fluid forces from runoff, or gravity forces to mobilize the redeposit soils of the type located here. Perhaps this inference can be extended to similar areas within the region that have similar soils and vegetal cover, and have the subdued topography that is characteristic of the undissected T_1 terrace.

Locality VI

Location:

Intersection of NW Corner of Sec. 31, T54N:R32W and NE corner of Sec. 36, T54N:R33W

UTM Coordinates: 1,197,500N:487,400E

C.O.E. Air Photographs: LPSP 1-219 and 1-220, 4-9-75

Figure Number: 3-2a and 3-2b

Physiographic Setting: Locality VI is located on the northwest facing colluvial foot-slope and adjacent to the terrace along Rock Branch tributary, approximately 700 meters upstream from its confluence with the Little Platte River. Rock Branch is a rock (gravel) based stream and one of the few tributaries where substantial bedrock outcrops occur along the banks. It owes this distinction to the fact that it is located in the pre-glacial, bedrock drainage divide discussed in the bedrock and preglacial drainage portions of Chapter III in this report. The gravel based mainstream is composed primarily of limestone cobbles, but sandstone and an occasional igneous-metamorphic variety occurs in the gravel, apparently derived from the glacial till. No substantial quantities of chert were found in the gravels.

Test trenches 146 through 151 were excavated at Locality VI. Test Pits 146 through 150 were excavated in the colluvial foot-slope. Test Pit 151 was excavated in the terrace which appears to be equivalent to the T_0 terrace of the Little Platte River. The colluvial foot-slope is formed at the base of a relatively steep valley wall that is underlain by shale with a few interbeds of limestone and has a thin soil layer (estimated at 10 to 100 centimeters thick) on the middle to upper slopes. The soil in the foot-slope is thicker due to an accumulation of colluviated soil intermixing with alluvial soil. The terrace is equivalent to the T_0 on the Little Platte River, and the soil is composed of alluvium derived from local sources in the Rock Branch drainage. The potential modes for burial of archaeological sites here would be in the area of colluvial foot-slopes on the terrace, and on the gravels underlying the fine-grained terrace soils. The gravels represent the channel deposits at some time in the past that were subsequently "buried" with fine-grained overbank deposits when the channel moved away. However, the gravel streambed and small channel bars are not considered to have a great potential as locations for sites because the channel gravel bars are small in areal extent.

Although this area is located on a T_0 terrace, which the model predicts is too young to contain archaeological material in context, this site was selected for deep testing to provide a more complete sampling of colluvial foot-slopes and not bias the testing to the T_1 terraces.

Summary of Test Pit Data

No cultural material was recovered from any of the test pits, yet an accumulation of apparently fired sandstone and limestone was encountered in Test Pit 146 at a depth of about 1.5 meters below a colluvial soil and on the surface of an alluvial soil surface. The alluvial soil overlies bedrock.

Identification of the red-stained rock as having been fired is somewhat speculative, but the varicolored nature of the individual rocks and the absence of similar coloring on other similar rocks encountered in the test pits of the Little Platte seems to imply that these rocks were fired. No cultural material was found in association with the rock. The rock could have been naturally deposited or disturbed by the stream, and may not be in the same position as it was when fired. Since no other cultural material was found, and the fired rock appeared to be disturbed, it could not be established whether or not this was an archaeological site. The lack of artifactual material indicates that this is not a significant site.

Locality VII

Location:

SW 1/4, Sec. 30, T54N:R32W

UTM Coordinates: 1,198,400N:488,900E

C.O.E. Air Photographs: LPSP 1-220 and 1-221, dated 4-9-75

Figure Number: 3-2a and 3-2b

Physiographic Setting: Locality VII is located on a narrow "spur" of the T_1 terrace near the juncture of Rock Branch, an unnamed ephemeral tributary, and the Little Platte River. The main modes of burial at this location would be overbank deposition from flooding of the Little Platte River, although such deposition is not believed to have been significant on the T_1 terrace based on the findings of this investigation. In fact, the extreme top of the spur may be erosional in nature since it has a slightly lower elevation than the main portion of the T_1 terrace.

In addition to the T_1 terrace at this locality, a perennially wet area occurs on the T_0 terrace below. This wet area may indicate that a spring is located nearby.

Test Pits 152 through 158 were excavated at Locality VII. Test Pits 152 and 153 were excavated on the tip of the T_1 terrace spur where the elevation is slightly lower and erosion rather than deposition any be the main geologic process operating. Test Pits 154, 155, 156, and 157 were located on the main portion of the T_1 terrace. Test Pit 158 was excavated in the wet area, which may be related to a spring location, on the T_0 terrace located just below the T_1 terrace.

Summary of Test Pit Data

Although several chert flakes and core were recovered from the ground surface of Locality VII, no cultural material or features were encountered in any of the test pits. The test pits located on the T_1 terrace (Test Pits 152 through 157) contained soils typical of the T_1 terrace at other localities within the valleys. Deposition does not appear to be a major geologic process operating on the T_1 terrace at this locality.

Test Pit 158, excavated in the wet area of T_0 just below the T_1 terrace contained a somewhat different soil stratigraphy. The upper 10 to 15 centimeters was composed of wet muck disturbed and mixed by the trampling of cattle. From 15 to 25 centimeters contained a less disturbed gray clayey silt with thin "stringers" of very fine sand. Between 25 and 50 to 55 centimeters revealed a dark gray-brown silty clay with strong to moderate medium blocky soil structure. This soil looks like the gumbo "B" soil horizon, but it may be depositional rather than pedological in origin. Below this soil (>50 centimeters) is a medium gray, weakly mottled yellow-brown clayey silt with a trace of sand that appears similar to T_0 alluvium observed in other locations of the valley. No cultural material was found within this pit. Unfortunately the ground was too wet and mucky to maneuver a backhoe so no further test pits could be excavated in the wet area and the spring could not be located. Since the spring was apparently located on the T_0 surface, any prehistoric cultural materials that might have occurred at that location may have subsequently eroded away.

Locality VIII

Location:

SW 1/4, NE 1/4, Sec. 6, T53N:R32W

UTM Coordinates: 1,190,250N:485,500E

C.O.E. Air Photographs: LPSP 1-178 and 1-179, dated 4-9-75

Figure Number: 3-2a and 3-2b

Physiographic Setting and Summary of Test Pit Data: Locality VIII is located on the lower slope and foot-slope of the valley wall of the Little Platte River near the downstream end of the bedrock narrows. The foot-slope emanates onto the T_1 terrace. The possible modes of burial that were expected would be colluviation possibly mixed with alluviation at the foot-slope. Excavation of one, long test trench (Test Pit 159) was made. The soil stratigraphy in the test trench showed that a thin veneer (10 to 35 centimeters) of dark brown clayey silt ("A" soil horizon) overlies yellow-brown loessial soils, with the veneer becomming thicker down slope as it merges with the alluvial soils of the terrace. Although a few scattered chert flakes and core were collected from the ground surface on the foot-slope, no cultural materials or features were recovered from the long test trench. In addition, the overall appearance of this location on the air photos and the soil stratigraphy suggest that some soils may have been excavated from the foot-slope, so any sites occurring here may have been removed. Unfortunately, time did not permit further investigation of foot-slopes along this valley wall to confirm or deny this premise.

Locality IX

Location:

SW 1/4, NE 1/4, Sec. 6, T53N:R32W

UTM Coordinates: 1,190,000N:485,900E

C.O.E. Air Photographs: LPSP 1-178 and 1-179, dated 4-9-75

Figure Number: 3-2a and 3-2b

Physiographic Location and Summary of Test Pit Data: Locality IX is located on the former bank (natural levee) of a channel scar that incises the T_1 terrace. The slightly raised topography around the perimeter of the channel scar tends to indicate the possibility of burial (deposition) by natural levee buiding processes. Test Pits 160, 161, and 162 were excavated in the "natural levee." The test pits were sterile of cultural material or features. The absence of cultural materials in the test pits and on the ground surface prompted no further testing in this locality.

CONCLUSIONS REGARDING DEEPLY BURIED ARCHAEOLOGICAL SITES WITHIN THE LITTLE PLATTE VALLEY

Of the nine localities tested in the deep testing program, two encountered cultural materials not detectable by surface survey, and were therefore considered buried. Both were at foot-slope locations, which seems to support the premise that the colluviation, perhaps combined with alluviation in some areas, on lower slopes and foot-slopes may be a prime location for the burial of archaeological sites.

Both sites were also located in areas that were "protected" from the main flow of floods by being located on the leeside of hills or other topographic highs. The finding of two archaeological sites in nine localities may not seem significant until it is viewed within the perspective of the overall investigation. During the geologic portion of this investigation, many localities and more than 80 test pits were excavated strictly for geologic purposes (see Figure 3-2a), and no cultural materials were encountered below the plow zone in any of the pits. Yet the portion of the deep testing program that was specifically designed to test for buried archaeological sites, based on the geomorphic model, encountered two out of nine localities that contained buried cultural material. In addition, only four of the deep-test localities were in colluvial foot-slopes (Localities III, IV, VI, and VIII). Therefore, two out of four foot-slope localities contained buried cultural material.

The other physiographic localities tested, namely meander scars, and locations that could be construed as being natural levees, produced no buried cultural materials. The soil characteristics at the natural levee localities indicated that there was no reason to suspect that buried sites could occur at these localities, and, like the T_1 terrace, most of the cultural materials would be contained at shallow depth within the soils. Whether or not the meander scars could be locations containing buried archaeological sites remains to be determined, although the possibility of containing "significant" archaeological sites seems lessened by the fact that none were encountered in the meander scars tested during the deep testing and geologic testing program. The meander scars that were tested were some of the most well developed scars within the study area in the lower and middle Little Platte valley. Since the number of archaeological sites seems to decrease in the upstream direction, it seems unlikely that significant sites might be located further upstream.

Thus, it seems that colluvial foot-slopes might have the highest potential for containing buried sites in the Little Platte valley. Spring locations are relatively absent or disturbed by Euro-American activity. Sites located on the upland T_1 and T_2 areas should, for the most part, be contained, or at least manifested in some way in the near surface soils exposed by plowing. The T_0 areas are too young to contain early archaeological sites. Of course, buried archaeological sites might be located in any one of these areas, except the T_0 terrace, due to very local erosional and depositional processes, but for the most part, they should not contain deeply buried sites beneath the plow zone.

Even though the colluvial foot-slopes seem to hold the most promise for containing buried archaeological sites in the Little Platte valley, the question remains whether or not sites contained in these deposits would be "significant" enough to merit further investigation. The two buried sites that were found in the deep-testing survey were interesting, but not deemed to be significant enough for further testing by the Principal Archaeological Investigator. It may well be that potentially buried sites in the colluvial foot-slopes do not hold enough promise to merit the time and expense of testing more foot-slope locales or testing any sites that might be. As Chapter III concludes, the Paleoenvironmental reconstruction of the Little Platte valley indicates that large scale occupation may not have occurred during Archaic time because the lack of water would have severely limited the resources in the valley. This conclusion is speculative at best, and more studies of earlier sites and their relationship to late Pleistocene and early Holocene environments will have to be made prior to any definitive conclusion regarding aridity and the distribution and density of early archaeological sites.

APPENDIX D-VII

SUMMARY OF THE SCHEDULE AND METHODS USED IN THE TEST PIT AND BORING INVESTIGATIONS

The geologic and geomorphic investigations included excavation of test pits and drilling of borings to supplement the subsurface information obtained from existing C.O.E. and Missouri Highway Department boring data for the Little Platte valley. Figure 3-2a shows the locations of most of the data points where subsurface data was procurred and used for this investigation. Locations of C.O.E. borings and Missouri Highway Department subsurface profiles are shown on Figure 3-2a merely to demonstrate the density and location of these data points, and therefore are not indexed or referenced according to a numbering system. Test pits excavated for the geologic and geomorphic investigation are numbered individually on Figure 3-2a whereas test pits excavated for the archaeological deep-testing localities are numbered in groups because test pits were too closely spaced to number them individually. Borings drilled for the geologic investigation are individually numbered and referenced on Figure 3-2a. The locations of samples procurred from areas outside the Little Platte valley are shown on Figure 3-1.

The general data for the test pits and borings, including report and field reference numbers, Township and Range locations, elevations, and landform associations are presented on Tables D-6 through D-9. Table D-6 summarizes the test pit data excavated for the geologic and geomorphic investigation and includes a schedule showing the sample depths and laboratory tests for test pits where samples were obtained. Table D-7 summarizes the test pit data for the deep-testing program; Table D-8 summarizes the locational data for the samples obtained outside of the Little Platte River valley; and Table D-9 summarizes the locational data for the borings.

The schedule of field work for the geologic and archaeological deep testing programs was as follows:

Late August, 1978: Original field reconnaissance of Little Platte River valley and surrounding region. Samples of Bignell and Peorian loess, and Illinioan alluvium were collected at localities reported in the Davis' dissertation (1955).

Late September to Late November, 1978: Test pit excavations and sample procurement for the geological investigation.

Mid-December, 1978: Drilling of borings for pollen and wood sampling, and determining depth of paleochannels.

Mid-May, 1979: Deep-testing for buried archaeological sites.

The geologic and deep archaeological test pits were excavated by a tractor-mounted, rubber-tired backhoe with a one meter wide bucket. The maximum depth of excavation was about 3.7 meters. Detailed logs were made in geologic test pits. Characteristics such as Munsell color, moisture content, soil composition and consistancy, geologic and pedologic structure, and generic type were recorded. The detailed test pit logs are not included with this report. The most pertinent geologic profiles are shown on the figures in Chapter III. The deep-testing excavations were not logged in detail unless an archaeological or important geologic deposit was encountered.

The borings were drilled using a Bombadier-mounted drilling rig involved sampling meander scar deposits using a 2-inch diameter (5.1 cm) "Shelby Tube" sampler that was 2-1/2 feet long (0.76 meter). Continuous samples were obtained through the meander scar deposits by pushing the sampler at two-foot (0.62 meter) intervals until coarse, bedload deposits were obtained. The Shelby Tube sampling was accomplished through a set of 4-inch I. D. (10.2 cm) hollow-stem augers that were advanced after every two-foot (0.62 meter) sample was taken so that the bottom of the augers were always at the top of the next sampling interval. The average sampling depth for the four borings was about 3.5 meters. The samples obtained from the Shelby Tubes were used to log the deposits in the mander scars after they were extruded and sealed in plastic bags. The bag samples were later analyzed for pollen and wood content (see Appendix D-IV).

APPENDIX E

NEWLY RECORDED ARCHAEOLOGICAL SITES

(This appendix is submitted separately since it contains locational data on archaeological sites.)

APPENDIX F

APPENDIX F-1: RESUMES OF PRINCIPAL INVESTIGATORS

APPENDIX F-2: NAMES OF FIELD AND LABORATORY PERSONNEL

APPENDIX F-1

RESUMES OF PRINCIPAL INVESTIGATORS

GAI CONSULTANTS, INC.

RESUME

NAME: William P. McHugh EMPLOYED BY GAI SINCE: May 1978

POSITION: Staff Archaeologist and Principal Investigator

EDUCATION:

B.S.	Anthropology	University of Wisconsin-Madison - 1954
M.A.	Archaeology	University of Wisconsin-Madison - 1964
Ph.D.	Archaeology	University of Wisconsin-Madison - 1971

SUMMARY OF EXPERIENCE:

Dr. McHugh is a specialist in prehistory and archaeology with expertise in artifact analysis and interpretation, paleogeographic modeling, and cultural ecology. He has conducted research in Wisconsin, Alaska, Kentucky, Tennessee, and Missouri as well as in Egypt and the Sudan. Dr. McHugh served as an archaeologist with the National Park Service (1954-55) and the Wisconsin State Historical Society (1960). He directed the University of Wisconsin-Madison investigations on Kodiak Island in 1961. Between 1961 and 1963 he conducted research on the prehistory of northeast Oklahoma resulting in a Master's thesis. In 1963-1964, Dr. McHugh was a member of the Combined Expedition to Nubia. Between 1965 and 1970, he conducted research on northeast African prehistory and paleogeography, which culminated in a dissertation and Ph.D. (1971).

In 1971-1973, Dr. McHugh undertook archaeological investigations in Wisconsin, initiating an archaeological survey of the Milwaukee River and directing archaeological site surveys of several mining and power plant sites. In 1971, he directed the University of Wisconsin-Milwaukee Archaeology Field School in Europe. From 1974-1976, he directed excavations at a late Mississippian site on the lower Cumberland River in Tennessee and conducted several mitigation projects in western Kentucky. Most recently, Dr. McHugh has directed the GAI Consultants' archaeological mitigation program at Smithville Lake, north of Kansas City, Missouri, under contract to the U. S. Army Corps of Engineers.

Between 1966 and 1978, he has taught at the University of Wisconsin-Milwaukee, Murray State University, and the University of Nebraska-Lincoln.

PROFESSIONAL AFFILIATIONS:

Associate, Current Anthropology
Kentucky Archaeological Society
American Center for Research in Egypt
Tennessee Anthropological Association
American Anthropological Association
Wisconsin Archaeological Society
Association for Field Archaeology

Society for American Archaeology

HONORS:

Research Assistant, University of Wisconsin, Department of Anthropology, 1960-63
NDEA Fellow, University of Wisconsin-Madison, 1972-3
Grantee, Smithsonian Institution Foreign Currency Program, 1966
Ford Fellowship (African Studies) 1966
Grantee, HEW Title VI award, 1968
Grantee, Smithsonian Institution Foreign Currency Program, 1968
Fellow, National Endowment for the Humanities Summer Seminar, 1975
Grantee, Smithsonian Institute Foreign Currency Program, 1978

GAI CONSULTANTS, INC.

RESUME

NAME: George D. Gardner EMPLOYED BY GAI SINCE: August 1972

POSITION: Staff Geologist

EDUCATION:

B.S. Geology Kent State University - 1970
M.S. Geology Kent State University - 1972

SUMMARY OF EXPERIENCE:

While at Kent State University, Mr. Gardner was employed as a graduate teaching assistant, research and field assistant, and geological consultant. He has also completed course work in soil mechanics and slope stability analysis at the University of Pittsburgh.

Mr. Gardner's experience includes studies in Pleistocene and Holocene geomorphology, stratigraphy, and fluvial and glacio-fluvial geology. He has prepared several research designs and conducted numerous subsurface investigations and mapping studies related to geomorphology and Pleistocene and Holocene geology. Mr. Gardner is experienced with many of the techniques and tools that are most often used in geological and geomorphological studies. A few of these include: quantative and qualitative drainage basin analysis; stream tracing; remote sensing (air photo, LandSat and Thermal Imagery Interpretation); soil classification by geological, pedological, and engineering systems; laboratory analysis of soils (grain-size analysis, chemical analyses, petrography, X-ray diffraction, soils engineering analysis); surveying and field mapping, sampling, and documentation.

Mr. Gardner's geological and geomorphological studies include: determining the Pleistocene and Holocene stratigraphy and history of glacial and fluvial deposits in northeastern and southwestern Ohio; southcentral New York; western Pennsylvania; northern West Virginia; eastern Indiana; northeastern Arkansas; and northwestern Missouri. He has also spent several weeks in central and southcentral Alaska observing active glacial and permafrost processes.

Mr. Gardner's archaeological geology investigations are conducted as part of an interdisciplinary approach to archaeological studies. His role as geologist/geomorphologist involves developing the Pleistocene and Holocene history of this site by determining the sites' physiography, geomorphology, and stratigraphy. These factors are then integrated into the archaeological study as an aid in determining the physiographic characteristics of the site at the time of occupation and how those characteristics have changed through time. He also provides on-site consultation to determine the site integrity in terms of natural erosion and depositional processes, and to determine the depth of the lowest possible sterile zone. Specific archaeological geology investigations conducted by Mr. Gardner include studies at: East Fork Lake, Ohio; Mexico Bottoms, Indiana; Rivervale, Arkansas; and Smithfield Lake, Missouri.

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PROFESSIONAL AFFILIATIONS:

Geologic Society of America
Pittsburgh Geological Society
Association of Engineering Geologists

GAI CONSULTANTS, INC

RESUME

NAME: Jack Donahue

POSITION: Senior Staff Geomorphologist

EDUCATION:

B. A.	Geology	University of Illinois	1960
Ph.D.	Geology	Columbia University	1967

SUMMARY OF EXPERIENCE:

Dr. Donahue has lectured extensively in stratigraphy, sedimentation, sedimentary petrology, biostratigraphy, and environmental, historical and physical geology at Queens College of the City University of New York and the University of Pittsburgh. He has expertise in paleoecology, paleoentology, geology, sedimentology and mineralogy by virtue of his education and experience. His background in physical archaeology includes that of staff geologist with the S.E. Dead Sea Archaeological Expedition in 1977.

Dr. Donahue's thesis for his Ph.D. was on the topic: Depositional Environments of the Salem Limestone (Mississippi, Meramec) of South-Central Indiana. He has been actively engaged in significant consulting, teaching, and field and laboratory work over the last ten years at a variety of works and locations, including a modern coal environment at St. Catherine's Island, Georgia; Meadowcroft Rockshelter; Conemaugh Group of Appalachian Basin studying paleoecology of marine faunas; teaching geology section of Ocean Science Course in U. S. Virgin Islands for Queens College; field consultant for Economic Development Administration, Puerto Rico; and field survey of Asares Island for Gulbenikian Foundation of Portugal.

Dr. Donahue has also written an impressive array of scientific, literary works and texts covering a broad range of subjects and expertise in his discipline.

PROFESSIONAL AFFILIATIONS:

Geological Society of America
Society of Economic Paleoentologists and Mineralogists
International Association of Sedimentologists
American Association of Petroleum Geologists
Paleontological Society
Paleontological Association
International Union of Paleontologists
American Association for the Advancement of Science
Pittsburgh Geological Society
American Quaternary Association

HONORS:

National Science Foundation Fellow
J. F. Kemp Fellow
Sigma XI

APPENDIX F-2

Names of Field and Laboratory Personnel

Field Supervisors:	Gerry Lang, Marc Collier, Alan Paris
Field Crew Members:	Theresa Baber, Brad Bailey, Dennis Falkenburg, Gene Jenkins, Leonard Bates, Ruth Myers, Lee Rasmussen, Arlene Smith, Karen Summers
Laboratory and Clerical Person:	Jill Schroeder
Photographer:	James Christensen

APPENDIX G

GLOSSARY OF TERMS

1. ABRADER: A stone implement with evidence of abrasion on the surface, sometimes featuring narrow grooves cut into the surfaces where such implements as bone awls and points were ground and sharpened.

2. ACCRETION GLEY DEPOSITS: Sediments deposited by short distance transport of soils by mass wasting processes into topographically low areas, which were subsequently gleyed by excessive moisture. Gleying is caused by partial oxidation and reduction of a soil's ferric iron constituents due to conditions of intermittent water saturation.

3. AEOLIAN: Variant of eolian.

4. ALLUVIAL SOIL (ALLUVIUM): Sediments deposited primarily by water, such as rivers, flood waters, lakes and esturaies.

5. ANITCLINE, ANTICLINAL: A fold with strata sloping downward on both sides from a common crest (see syncline, synclinal).

6. ALTITHERMAL: A period of warm, dry climatic conditions in the North American midcontinent, ocurring in the mid-Holocene between about 9000 and 3000 years ago. Also referred to as HYPSITHERMAL and XEROTHERMIC.

7. ANOMALY: Abnormality, deviation from the normal, deviant.

8. ARBOREAL: Pertaining to trees; living in trees; products of trees (e.g., fruit, nuts).

9. ASSYMMETRIC DRAINAGE: A drainage network where the drainage area on one side of the main stream is conspicuously larger (or smaller) than the drainage area on the other side.

10. AUTOCHTHONOUS: The earliest known populations native to a place; indigenous; aboriginal.

11. BACKHOE TRENCHES: Excavations made with a power-driven backhoe to provide exposures of the subsurface stratification.

12. BEDROCK DIVIDE: A drainage divide (interfluve) which has a bedrock superstructure, as opposed to a drainage divide formed by glacial deposits or other unconsolidated deposit.

13. BIFACIAL FLAKING: The process of removing material from both sides (or faces) of a chipped stone implement, such as an arrowhead or axe; contrasts with unifacial flaking in which flakes are removed only from one surface.

14. BURIED ARCHAEOLOGICAL SITE: Any archaeological site having contextual integrity and not detectable by surface survey (i.e., survey of plowed fields, shallow shovel tests).

15. CHANNEL GRADIENT (CHANNEL SLOPE): The ratio of the difference in elevation between two points on the channel bottom divided by the distance between the two points, as measured along the thalweg of the channel.

16. CHERT: A type of microscopically cryptocrystalline mineral variety of silica; chert fractures with a conchoidal fracture and chert flakes have sharp edges.

17. COLLUVIAL CONES: Cone or fanlike landforms formed by colluvial processes at the point where gullies and small ephemeral tributary valleys exit onto the valley floor.

18. COLLUVIAL FOOT-SLOPES: The base of a valley slope which contains an accumulation of colluvial soil that overlies the original floodplain (or terrace) deposits.

19. COLLUVIAL SOIL (COLLUVIUM): Any loose, heterogeneous and incoherent mass of soil material deposited chiefly by mass-wasting, usually on slopes or at the base of slopes. Also, alluvium deposited by unconcentrated surface runoff or sheet erosion.

20. COMMINUTION: To reduce to powder, pulverize.

21. CORD-ROUGHENED: Said of a ceramic vessel whose exterior surface has been treated with a cord-wrapped paddle during the pre-firing manufacture of the vessel.

22. CUT AND FILL (RIVER): A process of floodplain formation where material is eroded from one place by the stream and is deposited nearby until the surfaces of erosion and deposition are continous and uniformerly graded. For example, lateral erosion on the concave banks of a meandering stream accompanied by deposition within its loops.

23. DAUB: Dried or commonly baked mud that had covered part of a prehistoric structure (house wall) and which often retains impressions of the structural components (e.g., sticks, reeds, etc.).

24. DEBITAGE: A French language term designating the flakes and blades removed from a block of stone and which have not been modified by edge retouch or converted into formal tools. Debitage does not include cores (nuclei) or the debris or waste by-products (shatter, chunks) of stone tool manufacture.

25. DENDRITIC DRAINAGE: A drainage pattern where streams branch irregularly in all directions and at almost any angle, resembling in plan the branching habit of certain trees (such as oaks or maples).

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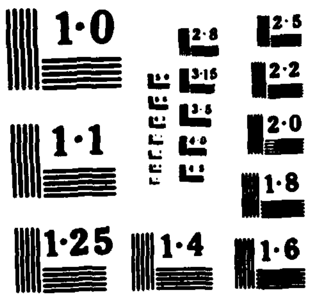
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26. DRAPE-LIKE TOPOGRAPHY: Landscape that has the appearance of having been blanketed, or draped and characterized by smooth transitions in grade between slopes, uplands and valleys with little evidence of erosional incisement. Typical of terrain covered by loess.

27. DRIFT: See Glacial Drift.

28. ECOFACTUAL, ECOFACT: A term modeled on the word artifact and meaning the material remains that provide information on environmental conditions and ecological relationships (e.g., animal bones, charred plant remains, pollen).

29. ECOTONE: An ecological community of mixed vegetation formed by overlapping of adjoining communities.

30. EOLIAN: Pertaining to, caused by, or transported by the wind.

31. EQUILIBRIUM (RIVER): A state at which the grade of a stream is in balance with the sediment load that it is required to transport.

32. FACTOR ANALYSIS: A statistical analysis that relates subsets within a group of data to each other to determine which subsets in the group are most alike, and which are dissimilar, at various levels of confidence.

33. FLOODPLAIN: That area adjacent to rivers or streams that is relatively flat and subjected to frequent flooding. Includes low lying terraces, colloquially called 1st and 2nd bottom if they are frequently flooded.

34. FLUME (FLUMING): A ravine, gorge, or other deep, narrow, steep-sided valley, with a stream flowing through in a series of cascades. An area of the stream where the flow of water is significantly constricted and flows with higher velocity than up and downstream segments.

35. FOOT-SLOPES: See Colluvial Foot-Slopes.

36. GEOMORPHOLOGY: A subdiscipline of both physiography and geology which deals with the form of the earth, the configuration of its surface, and the changes that take place in the evolution of landforms.

37. GEOMORPHIC HISTORY: The sequential order of geomorphic processes that led to the development of landforms.

38. GLACIAL: Adjective used to indicate having to do with processes of glaciation, or the geologic time in which glaciation occurred.

39. GALCIAL DRIFT: A sedimentary deposit formed directly or indirectly by glaciation. Glacial drift includes till, outwash, glaciolacustrine, moraine, and other glacial deposits.

40. GLACIAL PERIODS OR EPOCHS:

EPOCH	AGE (YEARS AGO)
Wisconsin	70,000 to 10,000
Illinoian	ca. 500,000
Kansan	ca. 1,000,000
Nebraskan	>1,000,000

41. GLACIAL SLUICEWAY: A watercourse that carried large quantities of glacial meltwaters and sediments away from the margin of the ice sheets.

42. GLACIAL SPILLWAY: A drainage divide which impounded waters during glaciation, and was overtopped and eroded by those waters, forming a narrow breach in the drainage divide.

43. GLACIAL TILL: A sedimentary deposit formed directly by a glacier, either as basal (lodgement) deposits or ablation (euglacial) deposits.

44. GRIT-TEMPERED: (See Temper).

45. GULLY: A small ravine. Any erosional channel so deep that it can not be crossed by a wheeled vehicle or eliminated by plowing.

46. GUMBOTIL: Gray to dark colored, thoroughly leached, nonlaminated, deoxidized clay, very sticky and breaking with starchlike fracture when wet, very hard and tenaceous when dry. Chiefly the result of weathering drift.

47. HAFTING: The attachment of a stone or metal blade or point to a shaft or handle.

48. ICE MARGINAL DRAINAGE: Drainage patterns that occur at the margin of glaciers. Often used to describe drainage systems that were formed at the margin of the ice sheets and continued to mimic the shape of the ice margin after glaciation ended. Examples are portions of the Ohio and Missouri Rivers.

49. INTERFLUVES: The land between the river and stream valleys.

50. INTERGLACIAL: The time period between the recognized major glacial periods; usually thought of as being warmer than the glacial periods.

51. ISOSTATIC BULDGE: See Proglacial Isostatic Buldge.

52. LACUNA: An empty space, as the space between solid particles in the wall of a ceramic vessel; also, the spaces left when shell temper fragments are leached out.

53. LOESS: A deposit of fine-grained, calcareous silt or clay considered to be wind-transported from its place of origin; loess may be reworked and redeposited through colluvial or alluvial processes.

54. LOESSIAL ALLUVIUM: A sedimentary deposit formed by both wind and fluvial depositional processes within the same, or nearly the same time frame. Formed primarily in tributary and main stream valleys.

55. LOESSIAL COLLUVIUM: A sedimentary deposit formed by both wind and colluvial depositional progress within the same or nearly the same frame of time. Formed primarily on slopes and in small gullies and swales.

56. LOCATIONAL ANALYSIS: The process of analyzing landforms, micro-environments, and physical features for the purpose of finding sites of human habitation.

57. LOCATIONAL MODEL: A model, based on landforms, microenvironments, and physical features which can be used to delineate potential locations of archaeological sites.

58. MANO: Here used to designate a hand-held stone artifact that displays evidence (e.g., ground and/or pitted surfaces, shaping) of preparation and use for grinding plant seeds or other substances like minerals and bone.

59. MEANDER SCARS: Arcuate shaped, topographic low areas that lie on the valley floor that represent former positions of the stream.

60. MICROTEXTURES: The very small textural characteristics on the surface of silt-sized grains, as detected using a scanning electron microscope.

61. MODAL CHARACTERISTICS (GRAIN-SIZE CURVES): The values or group of values that occurs with the greatest frequency in a set of data; the most typical observation.

62. MORPHOMETRICS: The quantitative characteristics of landforms and geomorphic features. For example, channel width and depth, channel gradient, valley gradient, sinuosity and wavelength of meanders.

63. NATURAL LEVEE: A long, broad, low ridge or embankment of sand and coarse silt, built by a stream on its floodplain and along both banks of its channel, especially in time of flood when water overflowing the normal banks is forced to deposit the coarsest part of its load.

64. NICKPOINT: Any interrupted break of slope, especially a point of abrupt change or inflection in the longitudinal profile of a stream or its valley, occurring where a new curve of erosion (graded to a new base level after a relative lowering of the former level) intersects an earlier curve, and resulting from rejuvenation, glacial erosion, or the outcropping of a resistant bed.

65. OIKOUEMENE: From the Greek root, oikos, meaning house or home; the area occupied and utilized by the people of a particular society or culture.

66. PAIRED TERRACES (RIVER): Paired river terraces are those where the elevation of the river terrace is essentially the same on both sides of the river. This contrasts with "unpaired" terraces where the elevations of terraces are not the same on both sides of the valley.

67. PALEOSOL: A buried soil horizon of the geologic past; when uncovered, it is said to be exhumed.

68. PENECONTEMPORANEOUS: A geologic process, or resultant structure or mineral, occurring immediately ofter (almost but not quite at the same time) as the main process, structure or mineral assemblage.

69. PERIGLACIAL: Said of the processes, conditions, areas, climates, and topographic features at the immediate margins of former and existing glaciers and ice sheets, and influenced by the cold temperatures; said of an environment in which frost action is an important factor, or of phenomena induced by a periglacial climate beyond the periphery of the ice.

70. PROGLACIAL ISOSTATIC BULDGE: A topographic bulge in the crust of the earth that occurs in front of a glacial ice sheet, in response to the depressing of the earth's crust beneath the ice sheet.

71. PROVENIENCE: The place an object comes from.

72. QUASI-EQUILIBRIUM: The state of balance or grade in a stream cross-section, whereby conditions of approximate equilibrium tend to be established in a reach of the stream as soon as a more or less smooth longitudinal profile has been established in the reach even though downcutting may continue.

73. RILLS: A very small erosional channel caused by a trickling stream of water or a very small brook; smaller than a gully, rills normally form in deposits having moderate to high erodability.

74. RIVER TERRACES: Relatively flat, horizontal, or gently inclined surfaces, sometimes long and narrow, which are bounded by a steeper ascending slope on one side, and steeper descending slope on the opposite (river) side.

75. RIVER TERRACE DESIGNATION-T_0, T_1, T_2: Designations for various terraces in a valley. The letter "T" stands for time. "T_0" indicates time-zero, or the time-zero terrace surface (the present surface). "T_1", indicates the first time-surface above the present surface, and so on.

76. SCOUR-LIKE FEATURES (RIVER): Features formed by the powerful and concentrated clearing and digging action of the flowing water, particularly during floods.

77. SEDIMENT LOAD (RIVER): The sediment that is being transported by a river as either suspended particles, or particles being moved along the bottom or sides of a channel by traction or saltation processes.

78. SEDIMENT RANGE: A detailed topographic profile of the ground surface across a valley that is to be inundated by impoundment of water. After impoundment of water, periodic soundings are made to measure changes in the profile caused by sedimentation.

79. SHELL-TEMPERED: (See Temper).

80. SHERD OR POTSHERD: A fragment of a fired, earthen vessel; a rim sherd includes part of the rim, a body sherd retains no part of the rim or neck.

81. SINUOSITY: The ratio between the channel length as measured along the thalweg of the stream, divided by the valley length, as measured along the axis of the valley. Sinuosity indicates how much longer the channel is with respect to valley length, which is an indirect measure of meandering.

82. SLOUGH: A water-filled secondary channel of a stream or river.

83. STEREOGRAPHIC AIR PHOTOGRAPHS: Aerial photographs viewed in pairs with a steroscope, producing an image that makes landforms appear three-dimensional.

84. STREAM ORDERING: A system of classifying a stream by the number of tributary branches that form it.

85. STRIAE: Minute, often microscopic scratches on the surface of different kinds of implements and produced by manufacturing and use.

86. SWALE: A low tract of land, especially moist or marshy ground.

87. SYNCLINE, SYNCLINAL: A fold in a rock formation in which the strata dip from opposite sides toward the axis.

88. TAPHONOMY: The study of the origin and burial of plant and animal remains, i.e., the processes and changes through which these remains reach their final condition.

89. TEMPER, TEMPERING MATERIAL: Material intentionally mixed in with the potting clay before a vessel is formed; tempering materials include a variety of aplastic substances such as crushed rock (grit), crushed mussel shells, sand or gravel, fibers (e.g., grass, straw), and even crushed ceramics (grog).

90. TERRACE: See River Terrace.

91. TERRAIN ANALYSIS: A term generally restricted to types of analyses of the land surface and geology that use remote sensing imagery, such as aerial photographs and satellite imagery.

92. THALWEG. The line joining the deepest points of a stream valley.

93. TILL: See Glacial Till.

94. TILL PLAIN: A generally subdued landscape caused by deposition of glacial drift directly by glaciers and usually consisting of gently rolling hills, swag and swale topography, end moraines and other features typical of glaciated terrain.

95. TOE-SLOPE: The base of a slope.

96. TRANSHUMANCE: The practice of a society's moving from place to place over the course of a year in order to exploit seasonally available resources; applied especially to pastoralists and their herds; used here because the principle is the same although no domestic animals are involved; this practice is not migration.

97. TRUNCATE: To shorten by cutting off the end or top; to terminate abruptly.

98. UPLANDS: Topographic areas that lie above the valleys and form relatively flat or gently rolling surfaces.

99. VALLEY FLOOR: The relatively flat area forming the bottom of valleys. The valley floor includes low lying river terraces.

100. VALLEY GRADIENT: The ration of the difference in elevation between two points on the same terrace divided by the distance between those points, as measured parallel to the general axis of the valley. The slope of the valley bottom or terraces.

101. VALLEY SLOPE: The sloping ground that lies between the upland and the valley floor, usually in reference to longer streams and tributaries.

APPENDIX H

REVIEWER'S COMMENTS AND GAI CONSULTANT'S REPLIES

H-I Comments of Fred A. Lafser, Director and State Historic Preservation Officer, Missouri Department of Natural Resources.

H-II GAI's Replies to Comments of Fred A. Lafser, Director and State Historic Preservation Officer, Missouri Department of Natural Resources.

H-III Letter from Jack R. Rudy, Chief, Interagency Archaeological Services - Denver, to Mr. Paul D. Barber, Chief, Engineering Division, Kansas City District, Corps of Engineers, regarding the request to review the draft report.

APPENDIX H-I

August 27, 1980

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 176 Jefferson City, Missouri 65102 (314) 751-4422

Mr. Paul D. Barber
Chief, Engineering Division
Kansas City District, Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Re: Cultural Resource Report, Smithville Lake, Little Platte River Valley, Clay and Clinton Counties, Missouri

Dear Mr. Barber:

The Historic Preservation Program has reviewed the July, 1980 draft report entitled "Before Smith's Mill: Archaeological and Geological Investigations in the Little Platte River Valley, Western Missouri" by Dr. William P. McHugh. We have the following comments to offer:

1. General Comments - Pagination of the report should be sequential. The method utilized in the draft is somewhat confusing if the reader is looking for a particular section or subject. Section headings should be in the same style. The arrangement used in the draft generates choppiness and leads to a feeling of general disorganization in the early part of the text. It would be more appropriate if Figures would be included in the text rather than in the appendix.

2. The Abstract as presently written is really a summary and would be more appropriate at the end of the report. A new Abstract meeting American Antiquity format should be written.

3. Table of Contents - The entire chapter scheme and chapter numbers is confusing; chapters should be sequentially numbered and heading redone to reflect equal levels of sections.

4. The Background Section is somewhat disjointed and difficult to read. It should be reorganized to facilitate transition between topics.

5. Acknowledgements should be included as a Preface, not in the text.

6. Introduction and Requirement Section is somewhat verbose but acceptable.

Joseph P. Teasdale Governor
Fred A. Lafser Director

7. The Research Design should address the following:

   a) Page I-6: The statement that the present drainage was established in the post-Nebraskan should be clarified. Perhaps it should read post-Kansan?

   b) Page I-17; paragraph 2 - the statement that only Upper Wisconsin and Holocene Terraces have potential for containing artifacts should be clarified and more fully explained. Older Terraces may have surfaces with cultural materials buried by subsequent alluviation. Also if the author means cultural components buried during terrace formation, this should be clearly stated.

   c) Page I-22 - Figure I-1 is not included in the Appendix.

   d) Page I-38 - Figure I-2 is not included in the Appendix.

8. In respect to the Geology Section it would be more appropriate if the bulk of this data be included as an appendix with a succinct summary in the text. The discussion of the geomorphology is loosely organized and tends to be confusing. This should be tightened up.
   There appears to be some deviation in the geomorphological model developed for the project and the results of the testing of this model. Specifically which of the methods utilized to date the upland areas resulted in questionable results, these methods applied similarly to alluvial context resulted in surprisingly better results. This should be clarified. A statement is presented in the text indicating that the radiocarbon date from the meander scan is representative of the entire T terrace sequence within the project area. As a meandering stream, such as the Little Platte, can leave erosional remnants of older age as well as more recent meander features, we question the applicability of this C_{14} date to the entire T_0 terrace. Also, the problem with the testing of the model stems from its lack of ability to account for negative data as well. The locational distribution of sites (Table 3-4) shows no sites on the T_0 terrace. This is now, however, informative as to internal structure. If the assumption is made in the model that buried sites could not occur in the T_0 terrace and this hypothesis is not tested, then we cannot account for their absence in reference to the model. If we look only where the model says we expect to find sites, then we cannot demonstrate that the model is valid. This amounts to sampling from an unknown universe, turning around and resampling from that universe in such a way that any data useful to validate or invalidate the model is excluded.

9. In regards to Archaeological Field Investigations, (IV-22 through IV-28), the report fails to provide information on the criteria utilized for defining a "site" relative to the previously unrecorded archaeological manifested decision in this section. While thirty-one (31) artifact producing loci

9. were reported found, only twelve (12) of these were officially recorded as "sites". Furthermore there is no information on these newly recorded "sites" in the text nor is any assessment or recommendation provided. As Pages VIII-52 and 53 were missing from the draft copy this office reviewed, perhaps this may explain this problem.
We have little comment on the remainder of the text with the exception that ceramic and lithic assemblage analysis would follow more logically after the discussion of the sites.

10. The Missouri Historic Preservation Program should be provided with U.S.G.S. Topographic 7 1/2 min. maps, if available, 15 min. if not showing the location of all archaeological sites within the project area, with appropriate indication of which sites were previously recorded, which recorded during present investigations, which sites were tested and which were fully excavated. These U.S.G.S. maps should also indicate which areas have been intensively surveyed during both the present and past investigations.

In conclusion, it is strongly recommended that since the Corps responsibilities pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's regulation 36CFR Part 800 have not been fulfilled, that the Council be provided a copy of this draft report and the consultation process as stated in Section 800.6(b) initiated as soon as possible.

Pending completion of this action, no action should be taken which would foreclose the opportunity for Council comments or would affect consideration of alternatives to satisfactorily avoid or mitigate any adverse effect on National Register eligible properties.

If you have any questions, please direct them to Mr. Michael S. Weichman of my staff at 314/751-4096.

Sincerely,

DEPARTMENT OF NATURAL RESOURCES

Fred A. Lafser

Fred A. Lafser
Director and State Historic
Preservation Officer

FAL:MSW:kld

cc: Pat Steele - National Advisory Council

APPENDIX H-II

REPLIES TO THE COMMENTS OF FRED A. LAFSER, STATE HISTORIC PRESERVATION OFFICER, MISSOURI

The ten numbered comments from the Missouri SHPO may be divided into three groups: a) those having to do with the form, format, organization, and arrangement of the report (Nos. 1-6); b) those having to do with the research design and the interpretations of the geological data (Nos. 7 and 8); and c) those having to do with the definition of an archaeological site and the plotting of the sites on U.S.G.S. topographic maps (Nos. 9 and 10). The comments will be addressed in order.

1. Pagination in the final report will be sequential within each of the two volumes and section headings will be standardized. A full table of contents will help the reader find any section. Regarding the suggestion that "it would be more appropriate if figures would be included in the text rather than in the appendix," we believe that the figures (drawings, graphs, photographs), all located in Volume II, along with the appendices and tables is an eminently suitable arrangement.

2. A single paragraph Abstract is now included and the long abstract is now entitled "Précis."

3. Confusion regarding the "entire chapter scheme and chapter numbers" will be eliminated by the serial numbering of the pages in the final report and inclusion of a complete table of contents.

4. The Background (Chapter I) Section comprehensively and clearly introduces the project by reviewing the Scope of Work of the project, a previous investigator's recommendations and outside reviewers' recommendations, the history of archaeological research in the Smithville Lake area, GAI's Research Design to meet the specifications of the Scope of Work, GAI's recommendations for changes in the Scope of Work, a summary of GAI's investigations, and concludes with a section with acknowledgements. We agree that the acknowledgements could be placed in a Preface as Comment No. 5 suggests, but maintain that Chapter I is logically organized, is clearly written, has satisfactory transitions between topics, and is more than adequate as an introduction, a background summary, and an overview of GAI's program at Smithville Lake.

5. Acknowledgements have been placed in the Preface.

6. We are gratified that the Introduction and Requirement Section are acceptable but are puzzled by the meaning of "somewhat verbose."

7. Comments on the Research Design, part of GAI's original proposal:

   a. The statement that the present drainage was established in the post-Nebraskan was made in the research design which was written prior to our investigation. During our investigation, we found that the drainage was established in post-Kansan time, not post-Nebraskan time. However, we cannot change the wording in the original research design since it is now a public document.

b. The statement in our research design that only Upper Wisconsin and Holocene Terraces have the potential for containing artifacts is wrong. During our investigation, we tested all terraces regardless of their apparent age. However, we cannot change the wording in the original research design since it is now a public document.

c. Figure I-1 has been included in the section with figures in Volume II.

d. Figure I-2 has been included in the section with figures in Volume II.

8. The appropriateness of including the bulk of the geology in an Appendix is a matter of opinion. We chose to include the detailed discussion in the main text for several reasons:

   a. Further separation of the Geology Section would require two appendices rather than one, thereby requiring more cross-referencing and causing more confusion for the reader;

   b. Chapter III on the geologic and geomorphic investigations was designed to stand on its own, and so that readers not interested in the details of the geologic investigation could easily find summaries of the findings by using the Table of Contents. For example, the "Historical Geomorphology of the Little Platte Valley" listed in the Table of Contents summarizes that subject in three and one-half pages and the "Conclusions" summarize the overall findings of the geologic studies as they relate to the archaeological sites.

   Chapter III was divided into distinct sections to avoid a long, continuous narrative dealing with many separate but interrelated topics. Unfortunately, the division of the report compromises the continuity and flow of the chapter and may give the appearance of loose organization. However, we do not feel that a change in format required to "tighten-up" the chapter is necessary to achieve the goals of the study.

   The methods used to study the upland deposits were not used to "date" them, as suggested by the SHPO's comment; rather, they were used to correlate them to deposits described in other areas of northwestern Missouri. The results of these correlations were not "questionable". What is questionable is the interpretation of Davis (1955: 119-121 and Plate 4) that the entire sequence of silty upland deposits overlying Kansan till is Wisconsin loess. We found that only the top part of that deposit was related to the Wisconsin loess, and that the deeper silty deposits were related more to the Kansan till, and not to Wisconsin loess. In this respect, the methods used in our study yielded excellent results. The fact that the same methods yielded excellent results for the alluvial sequence in the valley is not surprising since the alluvial soils were derived mainly from the upland areas.

There is no statement in the text indicating that the Carbon 14 date represents the age of the entire T_0 terrace. What is stated is that the Carbon 14 date supports the conclusion that the T_0 surface is relatively young, a conclusion based mainly on the geomorphology, mineralogy and textural characteristics of the T_0 surface. The relative youth of this surface, as indicated by its geomorphology, strongly suggests that it is not much older than the meander from which the age-date was obtained.

One of the main strengths of our geomorphic study is that it fully accounts for negative data in locating archaeological sites. The assertion that we "looked only where we expected to find sites" is wrong. We excavated many test trenches in all the landforms before we ruled any out as locations for potentially buried sites. We only tested areas where we expected sites could be buried in the last phase of the investigation, _after_ we determined where sites could not possibly be buried based on their geomorphic context. For example, the study of the T_0 terrace included excavating 14 test trenches to depths of 2 to 2.5 meters throughout the Little Platte drainage in the study area. None of these encountered any archaeological materials (Table D6 and D7). More importantly, our study showed: the T_0 was a product of river incisement and lateral accretion, rather than vertical accretion which is required to bury archaeological sites; and that the T_0 was too young to contain contextual material from the Archaic and Early Woodland periods. Only then was the T_0 terrace eliminated from the sampling universe. In our estimation, there is no better method to determine negative data than to use a study such as ours which employs the use of a geomorphic model.

9. a. As outlined both in Chapter IV (pp. 22-28 in the draft report) and in the Interim Report, dated January, 1979, (included as Appendix B in the draft report), GAI conducted a surface survey of 284 acres, locales selected because of their potential for containing sites in association with topographic features of some antiquity. It was our hope that the discovery of sites on the surfaces of these places would help identify locales with buried cultural remains of the Archaic and Early Woodland periods. Of 31 loci which produced cultural remains, 12 were registered with the Archaeological Survey of Missouri for designation, because we considered these loci to have some potential for contributing, upon further investigation, to refining or answering certain culture historical problems, i.e., the nature of Archaic settlement, the apparent poverty of Archaic and Early Woodland sites, etc. The 12 loci submitted for site designation were recommended because of the relative abundance of artifacts found within restricted areas, or because of the presence of artifacts diagnostic of a particular cultural period or phase (e.g., Late Archaic, Middle Woodland). We used no specific criteria for the minimal density of non-culturally diagnostic artifacts at a single loci that would determine recommending

it or not, and it is not now possible to retroactively apply such criteria. However, Appendix E-1 of our draft report (apparently not available for the SHPO's review) gives a list of the loci with cultural remains discovered by GAI, a list of the cultural remains found at these places, their legal description and physiographic location, and identifies those registered as sites with the Archaeological Survey of Missouri. Copies of the original site survey forms are presented in Appendix E-2 along with topographic maps (xeroxed from U.S.G.S. or more detailed COE maps) showing the location of the specific site and adjacent sites.

b. The SHPO's suggestion that the "ceramic and lithic assemblage analysis [Chapters V and VI] would follow more logically after the discussion of the sites" is, in fact, accomplished in the draft report. The sites GAI investigated, their physiographic settings, the methods employed in testing or excavating them, and even sites previously investigated are described and discussed in Chapter IV. The chapters on the ceramic and lithic analyses, designed to demonstrate the presence of both Late Woodland and Steed-Kisker components at specific sites, logically precedes the fuller discussion of these two sites (23 CL 274 and 276) which occupies Chapter VIII. Our interpretations of the meaning of the structures and features and the chronology of activities at these two sites is based in part on the cultural affiliations expressed in the ceramics and projectile points.

10. Appendix E provides the information solicited in this comment.

APPENDIX H-III

United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
INTERAGENCY ARCHEOLOGICAL SERVICES—DENVER
P.O. BOX 25387, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO

1201-05(W530)

JUL 24 1980

Mr. Paul D. Barber
Chief, Engineering Division
Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Attention: Camille Avery

Dear Mr. Barber:

We acknowledge receipt of Volumes I and II of the draft report entitled, "Before Smith's Mill: Archeological and Geological Investigations in the Little Platte River Valley, Western Missouri." We regret that we are unable to review this report in response to your request of July 16, 1980. Impending reorganization of Interagency Archeological Services functions severely curtails our ability to commit time and resources to coordinating activities. However, lack of review does not constitute our agreement with any or all parts of the report.

At the request of the Denver office of the Advisory Council on Historic Preservation, we have taken the liberty of transmitting the drafts on to their Washington office.

Sincerely yours,

Jack R Rudy

Jack R Rudy
Chief, Interagency
Archeological Services - Denver

APPENDIX I

TABLES

Table 2-1

VARIATION IN MONTHLY MEAN MAXIMUM AND MONTHLY MEAN MINIMUM TEMPERATURES AT ST. JOSEPH, MISSOURI, 1916-[illegible] (EXTRACTED FROM CHART 2-2, DEGREES F.)

Month:	J	F	M	A	M	J	J	A	S	O	N	D	$\bar{X}$, S.D.
Variation mean max. temp.	24	21	30	16	15	13	10	17	9	20	16	18	17.33, 5.9
Variation Mean min. temp.	21	15	22	13	12	10	5	9	12	14	11	16	13.33, 4.79

Table 2-2

VARIABILITY IN MEAN MONTHLY PRECIPITATION AT KANSAS CITY AND ST. JOSEPH, MISSOURI, FOR THREE 10-YEAR PERIODS (1921-30, 1931-40, 1941-50) (DATA FROM DECKER 1955)

Month	1921-30 K.C.	1921-30 S.J.	1921-30 Diff.	1931-40 K.C.	1931-40 S.J.	1931-40 Diff.	1941-50 K.C.	1941-50 S.J.	1941-50 Diff.	Total Diff.
J	1.24	.90	.34	1.35	1.23	.12	1.71	1.48	.23	.69
F	1.37	1.23	.14	.93	.84	.09	1.19	1.08	.11	.34
M	2.77	2.16	.51	1.82	1.88	.06	3.00	2.73	.27	.84
A	3.41	3.27	.14	2.91	2.94	.03	4.51	3.72	.79	.96
M	4.23	3.38	.85	5.13	3.88	1.25	3.87	5.02	1.15	3.25
J	5.69	6.60	.91	3.49	4.64	1.15	5.77	7.51	1.74	3.80
J	2.98	3.20	.22	1.90	2.72	.82	3.62	3.26	.36	1.40
A	4.00	3.75	.25	3.65	4.22	.57	4.03	3.50	.53	1.35
S	4.71	5.57	.86	3.21	3.67	.46	3.62	3.48	.14	1.46
O	3.42	3.42	.00	1.81	1.46	.35	3.57	2.58	.01	.36
N	2.21	2.19	.02	3.12	2.58	.54	1.17	1.18	.01	.57
D	1.19	.78	.41	1.37	.82	.55	1.92	1.96	.04	1.00
Total	37.22	36.45	4.65	30.69	30.88	5.99	37.98	37.50	5.38	16.02

Table [illegible]-3

VARIABILITY IN ANNUAL PRECIPITATION BY FIVE-YEAR PERIODS AT ST. JOSEPH, MISSOURI, 1876-1950

5-Yr. Pd.	5-Year Period		10-Year Period	
	Mean Annual Precipitation	Standard Deviation	Mean Annual Precipitation	Standard Deviation
1876-80	41.[illegible]3	11.19		
1881-85	30.52	[illegible].64	29.79	6.59
1886-90	29.05	4.65		
1891-95	34.4[illegible]	4.8[illegible]	[illegible]1.43	6.43
1896-1900	32.38	[illegible].1[illegible]		
1901-05	36.00	9.[illegible]7	35.12	8.41
1906-10	34.23	8.66		
1911-15	34.08	8.21	33.11	6.47
1916-20	32 26	4.80		
1921-25	34.69	5.93	36.48	5.42
1926-30	38.26	4.80		
1931-35	33.50	5.16	32.00	4.93
1936-40	30.49	4.73		
1941-45	40.15	5.03	37.52	5.38
1946-50	34.90	5.26		

(Data from Reeder 1932 and Decker 1955)

Table 3-1

COMPARISON OF PARTICLE-SIZE CURVE* CHARACTERISTICS-UPLAND DEPOSITS OF THE LITTLE PLATTE VALLEY AND LOESS DEPOSITS OF NORTHWESTERN MISSOURI

Unimodal	Bimodal in Fine Portion of Curve	Bimodal in Coarse Portion of Curve	Bimodal in Both Ends of Curve
	Bignell Loess***		Kansan Till*
	Peorian Loess***		Deep Loess-like Upland Deposits*

*Particle-size curves and discussion of laboratory methods and curve modalities are presented in Appendix D-II.

**Location of samples are shown on Figure 3-2a and 3-2b are referenced in Table D-6 of Appendix VII.

***Location of samples are shown on Figure 3-1 and are referenced in Table D-8 of Appendix VII.

Table 3-2

COMPARISON OF PARTICLE-SIZE CURVE* CHARACTERISTICS-
SOIL DEPOSITS OF THE LITTLE PLATTE VALLEY AND VICINITY

Unimodal	Bimodal in Fine Portion of Curve	Bimodal in Coarse Portion of Curve	Bimodal in Both Ends of Curve
Illinoian Alluvium***	Bignell Loess***	T_1**	Kansan Till**
T_1**	Peorian Loess***	T_0**	Deep Loess-like Upland Soil**
T_1**	Shallow Upland Soil**		T_2 Alluvium**
T_1**	T_1**		T_0**
	T_2 Shallow Soil Veneer**		

*Particle-size curves and discussion of laboratory methods and curve modalities are presented in Appendix D-II.

**Location of samples are shown on Figure 3-2a and 3-2b are referenced in Table D-6 of Appendix VII.

***Location of samples are shown on Figure 3-1 and are referenced in Table D-8 of Appendix VII.

Table 3-4

DISTRIBUTION OF ARCHAEOLOGICAL SITES* WITH RESPECT TO PHYSIOGRAPHIC POSITION IN THE LITTLE PLATTE VALLEY

Cultural Period(s)	Number and Position of Archaeological Sites			
	Bluff Top (Upland)	Bluff Top (Foot-Slopes)	Valley Floor (T_2 & T_1 Surfaces)	Valley Floor (T_0 Surface)
Paleo-Indian to Archaic Sites	6	0	39	0
Nonceramic Sites of Undetermined Cultural Period (many may be Pre-Woodland)	10	0	12	0
Kansas City Hopewell, Woodland, and Steed Kisker Sites	4	9	54	0

*Includes only sites located by surface survey.

Table 3-3

COMPARATIVE MORPHOMETRICS OF THE T_1 AND T_0
TERRACE FEATURES OF THE LITTLE PLATTE VALLEY

Morphometric Parameter	T_1 Measurement	T_0 Measurement	Comparison of T_1 and T_0
Width*	260 m	220 m	$T_1 > T_0$
Depth*	9 m	6 m	$T_1 > T_0$
Channel Gradient**	0.53 m/km	0.60 m/km	$T_0 > T_1$
Valley Gradient**	0.76 m/km	0.57 m/km	$T_1 > T_0$
Sinuousity***	> 1.6	1.4	$T_1 > T_0$

*Parameter measured at location shown in Figure 3-13 and at dam site (Figure 3-4). Widths were also obtained from analysis of aerial photographs.

**Parameter measured for portion of river shown in Figure 3-12.

***Parameter calculated for T_0 from Sediment Range 3 to Sediment Range 10 (Figure 3-2a); estimated for T. over the same segment of river valley by observations of meander scars from aerial photographs.

Table 3-5

COMPARISON OF STATISTICAL FACTOR-GROUPS FOR CLAY MINERALOGIES OF SLOPE DEPOSITS AND SELECTED DEPOSITS FROM THE LITTLE PLATTE VALLEY AND VICINITY*

Factor I	Factor II	Factor III	No Distinct Factor Group-Best Fit Between I and II	No Distinct Factor Group-Best Fit Between I and II
Bignell Loess	Kansan Till	Illinoian Alluvium	Foot-slope deposit Below the Paleosol**	Alluvium/Colluvium Overlying Till on the Ridge**
Shallow Upland	Deep Upland	T_2 Terrace Alluvium		
T_1 Terrace Deposits	Colluvial Soil Overlying Till**	Peorian Loess		
Foot-Slope Deposits above the Paleosol**				

*See: Appendix D-I for discussion of Clay Mineralogy and Factor Analysis; Appendix D-VII and Table D-6 for schedule of test pits, sampling and testing; Figure 3-2b for sample localities.

**Soil samples from Test Pit 78 shown on Figure 3-14.

TABLE 4-1

SITE 23 CL 208
LIST OF ARTIFACTS

Type of Object	Frequency	Type of Object	Frequency
Nail fragments	7	Glass fragments	4
Wire fragments	6	Crockery fragment	1
Tin fragment	1	Metal fragments	3
Large metal bolt	1	Metal buckle	1

TABLE 4-2

SITES 23 CL 273 and 275
LIST OF ARTIFACTS

	Frequency	
Type of Object	23 CL 273	23 CL 275
Baked clay or daub	258 (274 gm)	17 (7.8 gm)
Projectile point	0	1
Biface (ovate knife)	0	1
Scrapers	0	1
Utilized flakes	1	3
Biface thinning flakes	3	12
Decortication flakes	0	3
Flat flakes	0	1
Chipping shatter	0	4
Piece of string (historic)	1	0
Body sherds, shell-tempered	0	101
Rim sherds, shell-tempered	0	3
Rim sherds, grit-tempered	0	1

Table 5-1

COMPARISON OF POTTERY FROM 23 CL 113 and 23 CL 118

	23 CL 113		23 CL 118
	Platte Valley Ware	Unnamed Ware	Platte Valley Ware
Rims, N =	45	6	9
Body, N =	719	180	151
Temper	Missing; leached shell	Grit, angular particules	Identical to P.V. ware of site 23 CL 113
Texture	Very fine to coarse; temper holes at surface; compact and laminated	Medium coarse; temper pro-trudes through the surface	
Hardness	Weathered sherds, 2-3; slipped sherds, 3-3.5	3-4	--
Thickness:			
body	--	5-11 mm (7-8 mm)	--
rim	4-9 mm		
Surface treatment	Plain, smooth polished; slipped; polished-slipped	Cord-impressed (79.5%); smooth (21.5%)	Polished
Appendages	Yes: nodes on rim, loop handles	None reported	--
Decoration	Incising on slipped	Punctates below lip	Lightly incised wavy line
Vessel form	1.) Low rim broad, flattish shoulder; 2.) "rims which join a smoothly curved or rounded shoulder immediately at the neck" (Ibid.: 72).	1.) Straight-walled bowls or jars; 2.) small jar.	1.) Same as majority from CL 113 (e.g., No. 1); 2.) short, straight-rim on a round-shouldered, round body vessel;

Table 5-2

POTTERY RECORDING FORM

POTTERY RECORDING FORM SITE________ Specimen Cat. No.______

Part: rim (w/shoulder)body

Surface color:	Rim direction	Temper	Metrics
inner____	converging__	shell__	Lip thickness____
outer____	flaring__	grit__	Rim thickness____
core____	parallel__	grog__	Neck/shoulder thickness__
Hardness____		sand__	Body thickness____
Lip form	Rim-shoulder angle	combina-tion__	Base thickness____
flat__	acute__		Shoulder thickness____
beveled__	right__		
rounded__	obtuse__	Paste	Vessel measurements
rolled__	none__	compact__	Orifice:
subacute__		laminated__	Superior diam.__
acute__	Shoulder form	granular__	Minimum diam.__
other__	horizontal__	porous__	Rim/shoulder
Rim form	narrow__		inner diam.__
straight__	moderate__	Vessel	Width at shoulders__
incurved__	wide__	volume:__	Width at Lip__
outcurved__	sloping	Measured__	Total vessel ht.__
S-shaped__	steep__	Calculated__	rim height__
collared__	moderate__	Estimated__	body height__
braced__	gentle__		Max. vessel width__
other__			

Surface Treatment-Appendages

Lip	Rim/Neck	Shoulder/Body	Appendages

Table 5-3

PERCENTAGE OF SHELL- AND GRIT-TEMPERED
SHERDS BY COUNT AND WEIGHT
AT SITES 23 CL 276, 274, AND 226

	Total Sherds	Shell-Tempered N	Shell-Tempered Percent by Count	Shell-Tempered Percent by Weight	Grit-Tempred N	Grit-Tempred Percent by Count	Grit-Tempred Percent by Weight	Total Weight (gms)
23 CL 276	643	484	75.3	64.6	159	27.7*	35.4*	3257.8
23 CL 274	103	88	85.4	93.9	15	14.6	6.1	591.5
23 CL 226	161	131	81.4	94.8	30	18.6	5.2	2035.5
TOTAL	907	703			204			5884.8

*Includes 2 cross-mended *Nebraska Culture* sherds, a rim and an articulating shoulder sherd; see the separate discussion in Chapter V.

Table 5-4

DISTRIBUTION OF ALL SHERDS BY TEMPER TYPE AT SITES 23 CL 276, 274, AND 226

		Shell-Tempered				Grit-Tempered				
23 CL 276	Total Sherds (a)	N (b)	Percent (b : a x 100) (c)	Weight (gms) (d)	Percent (d : i x 100) (e)	N (f)	Percent (f : a x 100) (g)	Weight (gms) (h)	Total Weight (d+h) (i)	Weight of G-t : by Weight of S-t (h:d)
F.2	249	225	90.4	993.2	85.7	24	9.6	166.0	1159.2	.17
F.3	1	1	100.0	0.4	100.0	0	0	-	0.4	-
F.4	2	2	100.0	38.1	100.0	0	0	-	38.1	-
F.5	5	1	20.0	1.3	8.4	4	80.0	14.1	15.4	10.85
F.6	1	1	100.0	0.3	100.0	0	0	-	0.3	-
F.[illegible]	13	7	53.8	18.9	23.7	6	46.2	60.9	79.8	3.22
F.10	3	1	33.3	5.8	67.4	2	67.7	2.8	8.6	.48
F.11	42	42	100.0	72.8	100.0	0	0	-	72.8	-
F.14	6	5	83.3	35.2	93.8	1	16.7	2.3	37.5	.065
F.15	6	2	33.3	11.8	48.8	4	66.7	12.4	24.2	1.05
F.16	25	18	72.0	111.7	79.1	7	28.0	28.8	140.5	.26
F.17	19	16	84.4	42.4	54.2	3	15.8	35.9	78.3	.85
F.18	1	0	-	-	0	1	100.0	1.0	1.0	-
F.20	20	1	5.0	15.0	5.2	19	95.0	274.0	289.0	18.27
Subtotal	393	322	82.6	1346.9	69.2	71	17.4	598.2	1945.1	.44
Within Enclosure	113	61	54.0	239.2	42.8	52	46.0	319.7	558.9	1.34
Bet. F.2 & W. Wall	27	27	100.0	126.6	100.0	0	0	0	126.6	-
Outside Enclosure	113	74	65.5	390.8	62.3	39	34.5	236.4	657.2	.60
TOTAL	646	484	74.8	2103.5	64.6	162	25.2	1154.3	3257.8	.55
23 CL 274										
TOTAL	103	88	85.4	555.6	93.5	15	14.6	35.9	591.5	.065
F.107	16	16	100.0	204.7	100.0	0	0.0	0	204.7	-
23 CL 226										
F.201	124	121	97.6	1901.1	98.5	3	2.4	29.5	1930.6	.016
F.203	20	1	5.0	0.5	.009	19	95.0	57.4	57.9	114.8
Outside Features	17	9	52.9	28.9	61.2	8	47.1	18.3	47.2	.63
TOTAL	161	131	81.4	1930.5	94.8	30	18.6	105.2	2035.5	.05

Table 5-5

METRICAL ATTRIBUTES OF SHELL-TEMPERED RIM SHERDS
FROM SITES 23 CL 276, 274, AND 226

Cat. No.	Thickness (mm)			Rim Ht. (mm)	Orifice Diameter (mm)		Est. Vessel Breadth (mm)	Comment
23 CL 276	Lip	Rim	Body		Outer	Minimum		
254.1	8.6	7.2	3.8	7.0	260	240	-	
284	4.4	5.1	-	[illegible]	-	-	-	
286	8.3	7.8	5.2	13.0	320	300	-	
310	6.5	7.8	-	11.0	-	-	-	
336	4.6	5.0	6.5	11.0	170	160	-	
345	8.7	7.9	5.8	16.0	260	240	>310	
380	3.6	8.0	7.5	10.5	250	240	>320	
581	5.6	7.2	-	10.0	254	240	-	
594	6.4	7.8	6.3	13.0	250	230	>320	
612	4.6	7.8	5.9	13.0	165-205	160-200	>300	
614	4.0	5.7	3.8	13.0	144	140	-	
642.2	6.4	6.4	6.4	-	200	200	>200	
707	5.5	7.0	3.5	15.0	180	170	>280	
769	11.2	12.3	7.3	16.0	300	280	>360	
891	7.7	8.2	5.3	15.0	-	-	-	
896	8.1	9.0	5.3	17.0	160	150	>200	
1043.2	9.3	10.5	5.5	11.7	160	175	>280	
1123	8.2	8.7	-	18.0	220	200	-	a
1367	4.0	8.6	5.8	14.0	-	120	>190	
1510	-	11.9	-	14.0	260	250	-	
1526	7.2	7.2	7.5	13.0	295	280	>350	
1569	3.7	5.5	-	12.0	150	140	>200	b
1611	-	7.4	5.0	-	160	160	>220	
23 CL 274[c]								
950	3.3	5.6	-	8.2	-	-	-	
1017a	9.5	9.5	-	-	-	-	-	d
1189a	8.2	[illegible]	-	-	-	-	-	
1621	-	4.8	6.5	13.6	120	160	>230	
1645	6.2	7.6	4.5	32.3	255	240	>270	e
23 CL 226, Feature 201								
119.1	3.7	3.2	4.4	13.4	185	180	>270	
127.1	9.2	8.7	4.5	12.0	240	220	>290	
133.1	4.5	6.0	3.7	17.6	280	290	>410	
138.1	10.0	6.0	7.1	19.3	220	200	>350	
170.2	-	10.2	6.0	22.2	240	220	>320	
171.2	9.0	7.8	4.8	16.5	235	220	>310	
173.2	9.4	5.2	3.6	14.3	240	260	>300	

[a]Sherd has distinctive incised shoulder decoration and a denticulate ("saw-tooth like"), flaring lip-edge.

[b]Sherd has vertical incised lines below rim.

[c]The few sherds from this site have extremely eroded surfaces.

[d]Small, rounded tab extends horizontally from everted lip.

[e]Sherd with unusually high rim.

Table 5-6

SUMMARIZED METRICAL ATTRIBUTES OF SHELL-TEMPERED
RIM SHERDS FROM 23 CL 276, 274, AND 226

	Thickness*			Rim*	Orifice Diameter*		Breadth
23 CL 276	Lip	Rim	Body	Height	Outer	Minimum	Range*
N	21	23	17	21	18	19	
$\bar{X}$	6.5	7.7	6.1	12.98	221.8	206.0	
S.D.	2.14	2.13	1.95	2.67	57.2	54.1	
S.E.$\bar{X}$.	.49	.45	.47	.58	13.49	12.42	
							>200 to <360
23 CL 274							
N	4	4	2	3	2	2	
$\bar{X}$	6.8	6.9	5.65	18.0	212.5	200	
S.D.	2.6	2.1	-	12.6	-	-	
S.E.$\bar{X}$	1.35	1.05	-	7.3	-	-	
							>230 to <360
23 CL 226							
N	6	7	7	7	7	7	
$\bar{X}$	7.6	6.3	4.9	16.5	234.3	227.0	
S.D.	2.8	2.7	1.25	3.56	28.3	36.8	
S.E.$\bar{X}$.	1.13	1.04	.48	1.35	10.7	13.9	
							>270 to <410

*All measurements are in mm.

Table [illegible]

VARIABILITY AMONG FABRIC AND CORD-IMPRESSED [illegible] TABLE [illegible]

Sherd Catalog No.	Provenience	Description of Impression
1150/1112a	Feature 2 and N879 E287	Rim sherd with unique surface treatment; outflaring mouth, [illegible] lip edge expanding to a thickened ridge which is notched by sharp [illegible] oblique indentations; a narrow [illegible] band borders the above on the concave margin of the rim and immediately below appears the fabric or cordage surface impression which covers the lower rim and extends over the shoulder; this impression consists of vertically oriented, parallel, tight-packed (10 per 2 cm), narrow 1 mm thick plies featuring an S-twist. Vessel 1.
1263	Feature 17	Rim sherd with a straight wall [illegible] toward the lip which is rounded; the exterior surface of the lip is notched by shallow, [illegible] mm long, 2.5 mm wide grooves spaced [illegible] mm apart; below these grooves, the surface exhibits smoothed-over cord impressions with heavy plies (2 mm thick), widely spaced ([illegible] strands per 2 cm); the ply twist is indeterminate. Vessel [illegible].
1087	N878.13, N290.85, Ele. 88.54	Rim sherd extremely similar to 1263 above and probably from the same vessel; the vertical grooves on the outer surface at the lip are [illegible] mm long, 2.5 mm wide, and spaced 3-4 mm apart; smoothed-over cord impressions of *heavy strands* (2 mm thick) spaced [illegible] per cm and vertically oriented; the cord twist is probably of the [illegible]. Vessel 2.

Table [illegible]
(Continued)

Sherd Catalog No.	Provenience	Description of Impressions
1373d	Feature [illegible]	Rim sherd with straight, vertically-oriented wall, thinned toward the lip, lip rounded with a very slight outward expansion; the cord impressions begin immediately below and consist of parallel strands (1-2 mm thick), somewhat irregularly spaced (ca. 6 per 2 cm), and slightly obliquely oriented; the plies exhibit a Z-twist. Vessel [illegible].
574	Feature [illegible]	Rim with only a small part of the lip remaining; the lip is subacute and its outer aspect is punctuated by small, short slices ("dimples") causing an uneven surface; similarly, short slices are spaced 4-5 mm apart immediately below the lip, superimposed on the vertically aligned, fine stranded (1 mm), densely packed (8 per cm) cord impressions; the twist is indeterminable. Vessel 4.
1134a	N879, E285, Elev. 88.55	Body sherd with smoothed-over cord impressions with parallel alignment of fine plies (1 mm thick), loosely spaced (6-8 per 2 cm); probably Z-twist.
662	N874.[illegible]4 E283.15, Elev. 88.5	Body sherd with abraded surface; impressed with a coarse cordage (strands 2 mm and more wide, spaced about 4 per 2 cm), with some combining of strands; the twist is the Z-type.
642.2a	N874, E280 Elev. 88.64-88.50	Body sherd with smoothed-over cord impressions of plies (1 to 2 mm thick) spaced 10-12 per 2 cm; the twist is the Z-type in the replied strands.

Table [illegible]
(continued)

Sherd Catalog No.	Provenience	Description of Impression
12[illegible]4	N67, E[illegible] Ele. 88.[illegible]-88.41	Body sherd with smoothed-over cord impressions consisting of coarse strands (ca. [illegible] mm thick), loosely spaced (4.5 per 2 cm); twist indeterminate.
255.1 [illegible]	Feature [illegible]	Body sherd with two obliquely criss-crossing layers of cord-impression featuring heavy plies (2 mm thick), widely spaced (5 per 2 cm), twist indeterminate.
1138d	N67, E[illegible] Ele. 88.[illegible]-88.4[illegible]	Body sherd with smoothed-over cord impressions featuring fine, replied strands with Z-twist spaced about 4 per cm.
1[illegible]a	Feature [illegible]	Body sherd with impressed, parallel, heavy strands (2-3 mm wide), densely packed (6-7 per 2 cm); the twist seems to be the S-type.
[illegible]	N574.31, F264.43 Ele. 88.4[illegible]	Body sherd with widely spaced (6 per 2 cm), narrow (1 mm) strands; twist indeterminate.
117c	N-73, E2[illegible]1 Ele. 88.33-88.4[illegible]	Body sherd with variably spaced strands of two types, a heavier (2.5 mm thick) strand spaced about 4 mm apart and finer (ca. 1 mm thick) strands lying between and parallel to the heavy strands; the twist type is indeterminate.
1[illegible]a	Feature [illegible]	Body sherd with parallel, densely-packed (6 per 2 cm), heavy (3 mm wide) strands with the Z-twist.

Table [illegible]-7
(Continued)

Sherd Catalog No.	Provenience	Description of Impression
866	N873.52 E275.69 Ele. 88.51	Body sherd with abraded surface with widely-spaced (4.5 per 2 cm), coarse (2 mm wide) strands with a probable Z-twist.
563	Feature 2	Body sherd with densely packed (11 per [illegible] cm), fine (1 mm) plies which merge into thicker (2 mm) plies with a Z-twist.
61[illegible]	N874.48, E284.09 Ele. 88.49	Body sherd with a (?) woven fabric impression displaying intersecting horizontal and vertical elements with strands packed 6 per cm, the strands being about 1.[illegible]-1.4 mm thick.
1525	N880.26, E288.[illegible]5 Ele. 88.47	Body sherd with heavy, coarse (3 mm wide) strands packed 5 to 2 cm; these replied strands exhibit an S-twist.
1585 (1575, 1578, 1583, 1584)	N883.34 E295.15 Ele. 88.39 Feature 20	Basal sherd with a prominent node or eminence marking the lowest part of the vessel which must have had a subconical inferor portion; cord or fabric impressions spread out from this node in a radial fashion; the node itself is nearly devoid of impressions, their having been largely obliterated by abrasion; elsewhere on this sherd, the fabric impressions are faint but readily discernable, also having been reduced through wear; four other sherds from the same restricted area as No. 1585 share the same surface treatment and the layer or black organic residue which covers their inner surfaces; although none articulate with 1585, all are presumed to have been part of the same vessel and their paste and tempering permit this interpretation.

Table 5-8

CLASSIFICATION OF BODY AND BASAL SHERDS BY TYPE OF CORD IMPRESSION

Type of Cord Impression	Sherd Cat. Nos.	N	Percent
Fine strands, tightly packed	583	1	6.67
Fine strands, loosely packed	608, 1134a, 1138d, 1585 (basal sherd)	4	26.67
Coarse strands, tightly packed	888, 1223a, 1352a	3	20.00
Coarse strands, loosely packed	255.1/255.2, 662 1259b, 1525	4	26.67
Medium strands, tightly packed	642.2a	1	6.67
Woven	610	1	6.67
Other: fine strands between coarse strands	1178	1	6.67
	TOTAL	15	100.02

Table [illegible]

CHARACTERISTICS OF PLAIN-TREATED, [illegible] SHERDS FROM SITES [illegible]

Site and Cat. No.	Weight (gm)	Thickness (mm)	Hardness Mohs	[illegible]	[illegible]	Core	[illegible] (mm)	[illegible]	[illegible]
[illegible]									
[illegible]4	[illegible]	[illegible]	[illegible]-4	[illegible]	[illegible]	Mttld [illegible] gray	[illegible]	[illegible]	[illegible] sand
[illegible]	14.	11.[illegible]	[illegible]-4	Gray-[illegible]	Gray	Mttld gray-[illegible]	[illegible]	[illegible]	[illegible] sand
[illegible]	[illegible]	[illegible]	[illegible]	Mttld gray-tan	Black	Tan & black		[illegible]	[illegible]
11[illegible]4	32.4	11.[illegible]	2-[illegible]	Mttld tan-gray	[illegible]r-black	Dark gray		[illegible]	[illegible] sand
[illegible]	17.	11.	[illegible]-3	[illegible]	[illegible]		[illegible]4.	[illegible]	Very fine sand
1272	13.	[illegible]	[illegible]-4	[illegible]-gray	Orange	Dark gray	[illegible]2.	[illegible]	Fine sand
1343	[illegible]	[illegible]	[illegible]	Light brown	Black	Gray-black	[illegible]3.[illegible]	[illegible]	Fine silt
1373a	[illegible]	7.4	[illegible]-3	Brown	Dark gray	Dark gray	[illegible]	[illegible]	Very fine sand
13[illegible]	[illegible]	[illegible]	[illegible]-3	Mttld lt yel-br.	Gray	Black (burned)	[illegible]4.	[illegible]	Silty
1546	[illegible]	[illegible]	2-3	Mttld or-br.	Gray-or.	Dark gray	[illegible]		Very fine sand
16[illegible]4	3[illegible]	[illegible].1	[illegible]-4	Mttld br-or.	Gray	Mttld br-or.	[illegible]2.	[illegible]	Very fine sand
160[illegible]	3[illegible].7	[illegible].1	2-3	Tan	Tan-black	Gray	[illegible]	[illegible]	Fine silt
23 CL 274									
[illegible]11	[illegible]	7.3	3-4	Orange	Black	Orange	[illegible]	[illegible]	Fine sand
1012	[illegible]	[illegible]	3-4	Mttld br-gray	Gray-blk.	Gray-blk.	[illegible]1.[illegible]	[illegible]	Fine sand
116[illegible]/116[illegible]	[illegible]	[illegible]	3-4	Mttld gray-tan	Gray	Tan	[illegible]1.[illegible]	[illegible]	Very fine sand
23 CL 226									
1[illegible]2	16.8	7.	3-4	Mttld br-lt or	Blk.	Mttld br-gray	[illegible]		

Table 5-10

COMPARISON OF GRIT-TEMPERED AND SHELL-TEMPERED
POTTERY FROM 23 CL 276, 274, AND 226

	23 CL 276		23 CL 274		23 CL 226	
	S-t	G-t	S-t	G-t	S-t	G-t
Rim sherds:N	24	7	5	0	7	0
Body sherds:N	460	152	83	15	124	30
	Shell-Tempered Ware			Grit-Tempered Ware		
Temper	Shell fragments, leached in most cases; lacunae at surface and within core			Crushed rock (gen. quartz), granules, and sand; temper particles commonly visible at the surface		
Texture	Compact and generally laminated			Grainy; compact to slightly crumbly		
Hardness	2-4, mainly 2-3			2-4, mainly 3-4		
Body sherd thickness:						
Range	1.5 to 10.5 mm			3.6 to 12.3 mm		
mean ± s.d.	5.40 ± 1.40			7.65 ± 1.85		
s. error	.0689			.1718		
Surface treatment	Preponderantly plain and smooth; only 2 cord-impressed body sherds; probable slipping on some			Plain, smooth-surfaced (71.7%), cord-impressed (28.3%)		
Rim form	Short, slightly to moderately everted; slightly thickened			Rim not clearly distinguished from shoulder; rim walls gen. converge toward lip and taper or remain constant in thickness		

Table 5-10
(Continued)

	Shell-Tempered Ware	Grit-Tempered Ware
Appendages	Loop handles curving from lip to shoulder on a few (N=6) specimens; one example of a horizontal tab extending from the lip	None
Decoration	Two exceptional specimens exhibit neck-shoulder incised designs; otherwise no rim or body decoration	Rims exhibit lip modification
Vessel form	A squat, golbular body, wider than tall, with relatively broad sloping shoulders and a low rim	The only basal sherds found indicate a sub-conical body and the rims suggest the upper body walls converge toward the mouth

Table 5-11

STATISTICAL COMPARISON OF THE GRIT- AND SHELL-TEMPERED WARES FROM 23 CL 276 BASED ON BODY SHERD THICKNESS

	Shell-Tempered	Grit-Tempered
Sherd number	415	116
Thickness range	1.5-11.8	3.4-12.3
Mean	5.04 mm	7.65 mm
Standard deviation (σ)	1.40	1.85
Standard error of the mean	.0689	.1718
Variance (σ^2)	1.96	3.42

Z Test for the significance of the difference between the two sample means

$$Z = \frac{\bar{x}_{g.t.} - \bar{x}_{s.t.}}{\sigma(\bar{x}_{g.t.} - \bar{x}_{s.t.})},$$

Where

$$\sigma(\bar{x}_{g.t.} - \bar{x}_{s.t.}) = \sqrt{\frac{\sigma^2_{g.t.}}{n_{g.t.}} + \frac{\sigma^2_{s.t.}}{n_{s.t.}}}$$

$\bar{x}_{g.t.}$ = the mean thickness of the grit-tempered body sherds;

$\bar{x}_{s.t.}$ = the mean thickness of the shell-tempered body sherds;

σ = the standard deviation;

n = *the number of the sample*

$$Z = \frac{7.65 - 5.04}{\sqrt{\frac{3.42}{116} + \frac{1.96}{415}}} = \frac{2.61}{.185} = 14.11$$

With Z = 14.11, the chance that the two samples were *drawn from* the same population is extremely unlikely, much less than one in one-thousand chances.

TABLE 6-1

Comprehensive Listing of Lithic Artifact Categories

Chipped Stone

Implements	Fabrication and Utilization By-Products
1. projectile points	1. cores
2. scrapers	2. chipping shatter
3. drills (or perforators)	3. decortication flakes
4. bifaces	4. flat flakes
5. retouched flakes	5. biface thinning flakes
6. retouched blades	6. resharpening flakes
7. choppers	7. utilized flakes

Pecked, Ground, and Abraded Implements

1. milling stones
2. grooved abraders
3. polished and inscribed pebble
4. celts
5. three-quarter grooved axes
6. hammerstone

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Where

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$\bar{x}_{g.t.}$ = the mean thickness of the grit-tempered body sherds;

$\bar{x}_{s.t.}$ = the mean thickness of the shell-tempered body sherds;

σ = the standard deviation;

n = the number of the sample

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6. retouched blades	6. resharpening flakes
7. choppers	7. utilized flakes

Pecked, Ground, and Abraded Implements

1. milling stones
2. grooved abraders
3. polished and incised pebble
4. pestle
5. three-quarter grooved axe
6. hammerstone

TABLE 6-4

Measurements of Selected Classifiable
Projectile Points

Category and sub-category	Site No.	Cat. No.	Wt.* (gms)	Length* (mm)	Width* (mm)	Thick* (mm)	Plate
Small triangular							
Simple	276	1488	(0.9)	(22.0)	14.5	3.0	6-1:a
	274	1625	(1.1)	(18.0)	15.5	3.1	
Side-notched	274	1192	(1.0)	(28.8)	13.1	3.3	6-1:b
	276	724	(0.7)	(18.7)	11.3	3.9	6-1:e
	226	235	(0.5)	(18.2)	11.2	3.2	6-1:f
Double Side-notched	HM5	1245	0.5	16.8	12.0	3.0	6-1:c
Side & Basal notched	274	978	(0.7)	20.7	(13.9)	2.8	6-1:d
	276	726	(0.2)	(7.8)	12.5	2.0	
Medium Triangular	274	1627	(3.0)	(26.9)	19.0	5.5	6-1:cc
Small Corner-notched, A	276	770	(1.0)	(25.8)	(15.4)	3.2	6-1:j
	276	1605	1.0	27.8	(12.9)	3.9	6-1:i
	276	1686	0.6	19.5	11.5	3.7	6-1:k
Small Corner-notched, B	274	908	(4.1)	(26.6)	(24.2)	6.0	6-1:s
	274	1419	(1.3)	(14.6)	(18.0)	(5.7)	
	274	1420	(3.3)	(23.8)	(23.3)	6.1	6-1:w
	274	1624	(1.8)	25.3	(19.4)	4.5	6-1:x
	274	1626	2.4	30.0	21.0	4.8	6-1:q
	274	1679	(2.9)	(25.2)	(21.4)	5.2	6-1:t
	274	1680	4.3	34.0	28.4	6.4	6-1:p
	274	1690	(2.0)	(19.0)	22.5	5.0	

TABLE 6-4 (cont.)

Small Corner-notched, B (cont.)	271	188	(3.0)	(19.0)	(25.2)	6.6	6-1:v
	229	165	(2.4)	32.3	(21.5)	4.4	6-1:r
Small Corner-notched, C	(Site 9,	42)	(1.1)	(26.9)	16.5	3.6	6-1:n
	274	1623	(1.4)	(26.7)	15.9	4.2	6-1:m
Medium Sub-triangular	271	211	(2.2)	(29.5)	(23.4)	4.2	6-1:aa
	274	918	(4.4)	35.7	(27.5)	4.7	6-1:2
Projectile Point Fragments:							
Small specimens	276	169	(0.2)	(13.5)	10.3	2.4	6-1;g
	276	1113	(0.8)	(18.9)	13.1	3.5	
	276	1212	(0.5)	(19.0)	(9.7)	2.8	
	276	1349	(1.6)	(27.9)	13.9	4.3	
	274	1418	(1.1)	29.2	11.6	4.1	6-1:o
	274	1687	(0.8)	(28.2)	13.5	3.1	
Medium sized specimens	226	3	(2.4)	(13.5)	(24.3)	(6.1)	
	276	653	(5.1)	(19.3)	(25.0)	8.1	
	274	949	(2.2)	(13.3)	(23.7)	(6.0)	
	274	1643	(4.0)	(22.6)	(25.2)	(6.9)	
	274	1689	(1.5)	(16.5)	(22.2)	(4.5)	

* Figures listed within parenthesis indicate that dimension is incomplete because the specimen is broken.

TABLE 6-5

Measurements and Descriptions of Selected Chipped Stone Tools from Sites 23 CL 226, 273-276

SCRAPERS:

Site: Cat.No.	Dimensions (in mm) (L)	(W)	(T)	Comments
274:979	43.3	26.8	8.5	Bilaterally trimmed; smoothly convex end (Plate 6-2c; Figure 6-3c)
274:1300	115.7	34.4	9.2	Exceptional spec'men in size and workmanship; bilaterally trimmed flake-blade with regular, worn lateral edges; bulbar surface inverse retouch on distal end and along left edge near the butt (Plate 6-2g; Figure 6-3g)
274:1620	(21.3)	17.0	5.0	(Not illustrated)
276:761	(32.6)	20.6	11.8	Fragmentary specimen with steep, unifacial retouch that has produced both convex and concave edges but which has failed to remove a small, corner knob at the distal end (Figure 6-3n)
276:1385	36.8	24.0	9.1	Bilaterally trimmed specimen with pointed proximal end; the scraper edge is angular (Figure 6-3b)
226:1	38.9	36.2	11.8	Spatulate-shaped flake with concave bulbar surface and rugged removal scars on the dorsal surface; 3 edges have been carefully retouched producing 3 distinct scraper edges (Plate 6-2f; Figure 6-3f)

SMALL, EDGE-GROUND BIFACE

Site: Cat.No.	(L)	(W)	(T)	Comments
226:[illegible]37	[illegible]	25.9	10.1	Atypical small, bifacially flaked specimen with thin edges on three sides and a thick, curved, irregular edge on the fourth which is ground very smooth; the thin opposite edge is also ground but not as much. Used perhaps as a hi[illegible]-rubbing implement (Plate 6-[illegible]; Figure 6-3:1)

TABLE 6-5 (cont.)

DRILLS:				
274:980	(11.2)	10.6	3.8	A minute, spatulate-shaped specimen; the broad convex and one lateral edge of the base are unifacially retouched, the other lateral edge is bifacially retouched; the tip is missing (Plate 6-3i)
274:1614	(19.2)	15.1	4.0	The tip is missing and the base broken; it appears to have been burned (charred) on the surface (Plate 6-3j)
GRAVERS:				
276:1318	37.2	19.1	7.8	Small, asymmetrical biface with well-formed edges; the lateral edges converge to a stubby point from which a number of longitudinal microflakes have been removed (Plate 6-2n; Figure 6-3k)
276:869	42.0	18.0	4.1	A twisted flake, bifacially modified on all edges to produce a rectangular base and irregularly converging lateral edges forming a fine, slender point (Plate 6-3n; Figure 6-3i)
RETOUCHED BLADES AND FLAKES:				
274:976	(50.6)	15.1	4.7	Bilaterally and unifacially retouched blade fragment which has been charred by heat and infused with a dark stain on the surfaces; limited inverse retouch along one edge (Plate 6-2j)
275:44	(44.1)	23.5	6.8	Bilaterally and unifacially retouched cortex flake-blade fragment which has acquired dark surface stains and a pink cortex through thermal alteration (Plate 6-2m)
PEBBLE CHOPPER:				
276:1379	72.0	67.0	46.2	A moderate-sized quartzite pebble weighing 334 gm that has been modified by flaking on one of the narrower ends which is battered with use (Plate 6-4f; Figure 6-4a)

TABLE 6-6

Distribution of Selected Projectile
Point Categories by Site

Category	Site: 226	229	274	276	Other	Total
Small, Corner-Notched: A	0	0	0	3	1	4
B	0	1	8	0	1	10
C	0	0	1	0	1	2
Small, Triangular: simple	0	0	1	1	0	2
side-notched	1	0	1	1	0	3
side-and-basal notched	0	0	1	1	0	2
double side-notched	0	0	0	0	1	1
Total	1	1	12	6	4	24

Table 6-7

ANALOGS OF PROJECTILE POINTS FROM SITES 23 CL 274 AND 276 AT OTHER KANSAS CITY AREA SITES

MIDDLE MISSISSIPPIAN POINTS

Point Category	23 CL 274	23 CL 276	23 PL 13[a]	23 CL 113[b]	Various[c]	Fishing River[d]
Unnotched Small triangular		#1488	Type 10 NBb	Plate 4A-e	-	-
Unnotched Small triangular		#1113, #1212	Type 10 NBa; Fig. 6	Plate 4A-3	23 PL 113; Fig. 15M, Fig. 12Q; 23 PL 2, Fig. 40-o.	23 CL 155; Fig. [illegible] 23 RY 49; Fig. 2
Unnotched Small triangular	#1418	-	Type 1 NBA 3	-	23 PL 13; Shippee 1972, Fig. 15M	-
Small side-notched triangular	#1192	#724, #169	Type 7 NBa 2, or 1 NBa 3; Fig. 6	Fig. 2C	-	-
Side-and-basal notched triangular	#987	#726	Type 7 NBa 2	Fig. 2b	23 PL 13; Fig. 12a; 23 PL 9, Fig. 18N	23 CL 138, Fig.
Ovate-acuminate	#918	-	-	-	-	23 CL 5, Fig. 23

LATE WOODLAND POINTS

Point Category	23 CL 274	23 CL 276	23 PL 13	23 CL 113	Various	Fishing River
Small corner-notched (sub-type A)	#770, #1686 #1605	#770, #1686 #1605	-	-	23 CL 1, Shippee 1967, Fig. 21C	Various sites, F 16 d, e, 19b.
Small corner-notched (sub-type B)	#908, #1420 #1690, #1419 #1680, #1626	-	-	-	23 CL 1, Shippee 1967, Fig. 19F	-
Expanding base	#949	-	-	-	23 CL 1, Shippee 1967, Fig. 21J	-

[a]Data from Wedel, 1943, Archaeological Investigations in Platte and Clay Counties, Missouri.

[b]Data from Calabrese, 1968, Doniphan Phase Origins: an Hypothesis Resulting from Archeological investigations in the Smithville Reservoir area, Missouri. 1968.

[c]Data from 1) Shippee, 1967, Archeological Remains in the Area of Kansas City: The Woodland Period; and 2) Shippee, 1972, Archeological Remains in the Kansas City Area: The Mississippian Occupation.

[d]Data from Martin, 1976, Prehistoric Settlement-Subsistence Relationships in the Fishing River Drainage, Western Missouri.

Table 7-1

ARCHAEOBOTANICAL REMAINS FROM SITES 23 CL 226, 274, AND 276

Site	Carbonized Plant Remains Present by Genus or Species
226	Hickory Nut Shell Fragments (*Carya* sp.) Maize (*Zea Mays*) Hazelnut (*Corylus americana*) Hickory, Oak, Elm, Maple, and Wild Plum or Cherry Charcoal
274	Marshelder (*Iva annua*) Hickory Nut Shell Fragments (*C. ovata*, *C. texana*) Lambsquarter (*Chenopodium* sp.) Maize (*Zea Mays*) Charred Nut Meat Hickory, Black Walnut, Oak, Elm, Hackberry, and Mulbery Charcoal
276	Black Walnut Shell Fragments (*Juglans nisya*) Hickory Nut Shell Fragments Hazelnut Shell Fragments (*Corylus americana*) Maize (*Zea mays*) Wild Plum Seed (*Prunus americana*) Marshelder (*Iva annua*) Hickory, Walnut, Oak, Elm, Elderberry, Persimmon, Poplar (or Willow), and Honey Locust Charcoal

[Recent, uncarbonized seeds or fresh embryos of ragweed, grass (*Sectoria* sp.), knotweed (*Polygonum persicaria* type), sedge (*Cyperaceae*), and elderberry (*Sambucus canadensis*) are variously present at these sites; see Table 7-2.]

[illegible]

SUMMARY OF ARCHAEOBOTANICAL REMAINS BY FEATURE [illegible]

Site & Feature	Nut Meat (Unid.)	Acorn	Carbonized Nuts (gms): Hickory	Black Walnut	Hazelnut	Carbonized Seeds (No.): Zea mays	Iva annua	Chenopodium sp.	Prunus americana	Hickory	Walnut	Oak	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Maple	[illegible]	Poplar Willow	Honey Locust	[illegible]	Total Wt. [illegible]
226:																							
2.1			<.1			5				P		P	[illegible]					[illegible]					
2.3					<0.1																		
274:																							
101 (1)			1.3	1.[illegible]		10	2[illegible]			.[illegible]												.[illegible]	
101 (2)			1.3	1.0		1[illegible]	20																
101B	[illegible].1		4.1			1	30	[illegible]															
1?2							3[illegible]																
1?3			<.1					2[illegible]															
1?4							4[illegible]															.[illegible]	
1?7		1[illegible]						1[illegible]				2.52*	1.34*	.44*	.[illegible]							.4	
276:																							
2			<.3									P	P										[illegible]
3																							
4																							
5			<.2			10																	
6				<.1																			
8																							
9							1[illegible]																
16			<.1		<0.1	30			1[illegible]		1.7												
17			[illegible].3							P		P	[illegible]				4.1			.[illegible]		.4	
18			[illegible].3	<0.1																			
20					1[illegible]			1[illegible]		46.1		24.[illegible]	1.7			[illegible]	1[illegible]				[illegible]	44.4	134.[illegible]

Table 7-3

MEASUREMENTS OF *IVA ANNUA* SEEDS AND ACHENES FROM SITES 23 CL 274 AND 276

Feature	Seed Dimensions Length	Seed Dimensions Width	Estimated[1] Achene Dimensions Length	Estimated[1] Achene Dimensions Width
101B	3.2	1.9	3.9	2.3
102	4.0	2.3	4.7	2.7
106	3.5	2.4	4.2	2.8
101 (Sample 2)	3.4	2.3	4.1	2.7

	Actual Achene Dimensions Length	Actual Achene Dimensions Width
106	3.8	2.1
106 (Sample 3)	4.2	2.8
101 (Sample 2)	4.0	2.3
Feature 9	4.3	2.2
Mean =	4.2	2.5
Reconstructed[2] fresh =	4.7	2.8

1. Assuming that seeds are approximately 0.7 mm smaller smaller in length and 0.4 mm smaller in width than their achenes.

2. Assuming that carbonized achenes are approximately 10 percent smaller than fresh seeds (Yarnell 1972: [illegible]55-341).

Table 7-4

PERCENTAGE OF CHARCOAL BY SPECIES
IN FEATURES 17 AND 20, SITE 23 CL 276

Tree Species	Charcoal Weight (gms)	Charcoal % of Identified	Heat Value of Wood
Hickory	62.4	41.48	93%
Oak	40.7	27.10	80-92%
Elm	20.4	13.58	73%
Walnut	0.0	--	80%
Elderberry	1.0	0.67	?
Persimmon	21.8	14.51	96%
Poplar/Willow	0.68	0.45	53% (est.)
Mulberry	p	-	-
Honey Locust	3.3	2.2	94%
	150.2	99.99	
Unidentified	44.8	22.97% of the	
	195.0	total weight	

(p = present)

Table 7-5

RADIOCARBON AGE DETERMINATIONS AND CONVERSIONS FROM SITES 23 CL 226 AND 276

GAI Sample	Site: Feature	Laboratory Sample No.	Radiocarbon Years B.P.	A.D. Date (5570 t/2)	A.D. Date* (5730 t/2)	Suess#	Wendland# & Donley	MASCA#	50 Year# Averaging
C1a	276:17	UGa-2714	1220 + 135	730	693	740	760	750-770	700-770
C1b	276:17	GX-6312	1130 + 140	820	786	860	852	850-870	810-860
C1c	276:17	GX-6313	1265 + 130	745	710	765-825	775	775-795	755-795
C4a	276:20	UGa-2857	1240 + 60	710	673	720	738	710-730	680-750
C4b	276:20	GX-6638	980 + 125	970	941	1030	1002	1000	990-1040
C3	226:201	UGa-2715	385 + 115	1565	1554	1465	1544	1475	1425-1475

(* Calculated by multiplying the radiocarbon years B.P. by 1.03 and subtracting the product from 1950.)

(# These data were interpolated from the table in Appendix 1A in McKerrell 1975.)

(Sample C1, C1b, and C1c are parts of the same charcoal concentration in Feature 17; Samples C4a and C4b are similarly parts of a second charcoal concentration in Feature 20.)

Table 7-6

FREQUENCY OF FAUNAL REMAINS FROM
SITES 23 CL 226, 274, AND 276

Site 23 CL 226

Provenience	OSTEOLOGICAL SPECIMENS
F. 201	38 (Not including 10 fish scale fragments)
F. 203	16
Surface	1 (Tooth, M^3 of *Sus scrofa*, domestic pig)
Total	55 (Not including 10 fish scales)

Site 23 CL 274

F. 101B	1
F. 103	1
F. 105	4
F. 106	37 (19 recovered by flotation processing)
N1054.31, E356.88	4
Total	47

Site 23 CL 276

F. 2	139 (23 recovered by flotation processing 12 elements of recent *Bufo* sp., toad)
F. 9	4
F. 14	2
F. 17	1
N873 E291	4
N881 E293	22 (Tooth fragments of *Odocoileus* sp., white-tailed deer)
N875 E278 Ele. 88.53-88.48	1 (Proximal sesamoid of Odocoileus sp.)
Total	173

TABLE 8-1

SITE 23 CL 274: Dimensions, Elevations, and Contents of Features and Postmolds

Feature	Dimensions (cm) Max Length	Max Width	Total Depth	Absolute elevation datum = 100 m	Contents and Comments
101	82	95	13	87.85-87.22	Daub, charcoal, 14 flakes, 5 potsherds
102	111	84	16	87.85-87.69	Daub, charcoal, 5 flakes
103	62	83	25	87.85-87.60	Daub, charcoal, 4 flakes
104	60	108	24	87.84-87.60	Daub, charcoal, 7 flakes, 1 biface fragment
105	46	37	5	87.76-87.71	Daub, charcoal
106	80	88	24	87.71-87.47	Calcined bone, 8 flakes
107	174	172	13	87.71-87.58	17 potsherds, 14 flakes, 1 biface fragment
108	92	92	8	87.77-87.69	6 flakes
Postmolds					
A	14	15	15	87.69-87.54	None
B	11	12	--	87.63-?	Destroyed by heavy rain and profile not drawn
C	12	12	32	87.64-87.32	None

TABLE 8-2

SITE 23 CL 274: Distribution of Ceramic and Lithic Artifacts

Feature or Area	Potsherds S-T	Potsherds G-T	Projectile Points T	Projectile Points S-N T	Projectile Points S-B N-T	Projectile Points C-N	Projectile Points O-A	Projectile Points F	Flakes	Biface Fragments
101	5	1	-	-	-	-	-	-	14	
102	1	0	-	-	-	-	-	-	5	
103	0	0	-	-	-	-	-	-	4	
104	1	0	-	-	-	-	-	-	7	1
105	0	0	-	-	-	-	-	-	0	
106	0	0	-	-	-	-	-	-	8	
(Subtotal)	(7)	(1)							(38)	(1)
107	17	1	-	-	-	-	-	-	14	1
108	—	—	—	—	—	—	—	—	6	—
Grand Total	24	2	0	0	0	0	0	0	58	2
Proximity of Features	52	0								
Away from Features	8	6	1	2	1	9	1	6		

*T = Small triangular; S-NT = Small triangular with a single notch on each lateral edge; S-B-N-T = same as S-NT with addition of a single notch on basal edge; C-N = corner-notched; O-A = Ovate-accuminate; F = fragments of projectile points.

TABLE 8-3

SITE 23 CL 274: Distribution of Botanical and Osteological Remains

	carbonized seeds					carbonized nuts (gms)								
Feature	maize	marshelder	lambsquate	wild plum	acorn	hickory	walnut	hazelnut	mulberry	elm	hackberry	oak	Mammal bone Fragments	Deer
101	1	2				1.0								
101B	1	3	10			4.1								
102		3											1	
103			2			<0.1							1	
104														
105													4	
106	3												34	?1
107	1				1	.2			.9	1.4	.9	2.5		

(All the bone fragments are calcined and quite small. One specimen from F. 106 may be white-tailed deer, Odocoileus sp. Osteological identifications were by Carl R. Falk, Division of Archaeological Research, University of Nebraska-Lincoln. Seeds and nutshells were identified by Frances King, Illinois State Museum.)

TABLE 8-4

SITE 23 CL 276: Metrical Attributes of the Four-sided Enclosure

	West	North	East	Outer South	Inner South
No. Of postmolds	12*	12	12	7	4
Length of row (meters)	7.3	7.4	7.4	4.3	4.6
Average spacing (length between centerpoints of outer p.m.'s ' no. of intervals)	.66	.64	.66	.716	1.53
Statistically-derived spacing: mean	.662	.673	.675	.727	1.53
standard deviation	.092	.086	.088	.237	.127
standard error of mean	.029	.027	.028	.106	.089
Postmold spacing (meters) (centerpoint-centerpoint)					
one to two	.56	.76	.64	.86	1.46
two to three	.70	.76	.60	.60	1.68
three to four	.68	.70	.64	.78	1.46
four to five	.52	.68	.62	1.10	--
five to six	.82	.64	.80	.44	--
six to seven	.72	.70	.64	--	--
seven to eight	.72	.66	.82	--	--
eight to nine	.68	.62	.76	--	--
nine to ten	(.68)*	.76	.72	--	--
ten to eleven	(.68)*	.66	.64	--	--
eleven to twelve	.52	.46	.54	--	--
Total Length	7.28	7.40	7.42	4.36	4.60

*Includes one hypothetical postmold (No. 10) which would have been located in the middle of Feature 9, a dark, trash-filled pit. The actual intra-centerpoint distance between nine and eleven (Postmolds #7 and #8) in the west row is 1.36 meters.

TABLE 8-5

SITE 23 CL 276: DESCRIPTION OF FEATURES

Feature	Description
1	Rodent run (not depicted on site plan).
2	Large midden deposit outside west wall (Ca. 3.98 x 2.82 m, .40 m deep); filled with abundant pottery and other artifacts.
3	Small, shallow pit (.50 x .20 m, .20 m deep) inside west wall.
4	Small, shallow pit or postmold (.26 x .19 m), .08 m deep) near the west wall.
5	Medium sized, shallow pit (1.2 x 1.0 m, .12 m deep) near southwest corner of structure.
6	Small, shallow pit (.48 x .20 m, .16 m deep) near southwest corner.
7	Very small, very shallow pit or postmold (.16 x .14 m, .065 m deep) located between Postmolds 4 and 5 of west row and having a different soil texture from adjacent, much deeper postmold (a possible rodent den).
8	Large, elongate, very shallow depression (1.80 x .80 m, .10 m deep) in the south central part of the structure; it contains sparse cultural debris; possibly part of the plow zone as bilobed profile suggests.
9	Large shallow pit (1.60 x 1.50 m, .20 m deep) that straddles (and predates) the west wall; it contains moderate cultural debris including both grit-tempered and shell-tempered pottery.
10	Medium-sized, shallow pit (.94 x 1.19, .22 m deep) in the northwest quadrant; it is unusual because of its outline.
11	Medium-sized, moderately deep pit (.90 x .66 m, .29 m deep) located outside the west wall; it contains shell-tempered but no grit-tempered pottery.

TABLE 8-5
(continued)

Feature	Description
12	Small, very shallow pit or postmold (.20 x .16 m, .04 m deep) near the southwest corner located almost in-live with the south inner wall.
13	Small, shallow pit or postmold (.18 x .28 m, .14 m deep) located north of the southeast corner.
14	Large, elongate, very shallow feature (1.3 x .78 m, .06 m deep), located about midway along the east wall; it is similar to Feature 8 and may be a plow scar. Five shell-tempered and three grit-tempered sherds were recovered from this feature.
15	Long, elongate, very shallow feature (1.48 x .88 m, .09 deep) located near the NE corner; it may be another deep plow scar like Features 8 and 14.
16	Medium-sized, moderately deep pit (1.02 x .84 m, .27 m deep) located near the northeast corner of the structure.
17	Large, moderately deep (1.52 x 1.50 m, .28 m deep) feature with a mass of reddened, fire-burned limestone rocks, charcoal, and a few potsherds in the upper part.
18	Small, shallow pit or postmold (.26 x .20 m, .10 m deep) located near the center of the four-sided structure.
19	Small, moderately deep pit or postmold (.28 x .23 m, .21 m deep) located near the center of the structure.
20	Large, moderately deep feature (1.82 x 1.40 m, .22 m deep) located 2-4 m east of the northeast corner of the structure; it contains a mass of reddened, fire-burned limestone rocks, a large amount of charcoal, and grit-tempered sherds among the rocks and shell-tempered sherds in the upper zone.

TABLE 8-6

SITE 23 CL 276 Range of Elevations of the
Tops of Postmolds and Central Features

	Elevation Range*	Difference
North row	88.52-88.48	4 cm
West row	88.61-88.49	12 cm
East row	88.50-88.43	8 cm
Inner South row	88.45-88.40	5 cm
Outer South row	88.45-88.40	5 cm
Central features (18,19) and Postmold E	88.55-88.54	1 cm

(*The elevations at which the tops of the individual postmolds in the north row appear range between 88.52 and 88.48 meters. The west row displays the greatest range and has the highest postmold tops.)

Table 8-7

DIMENSIONS AND FORM OF LATE PREHISTORIC STRUCTURES IN THE KANSAS CITY AREA

Site	Name	Shape	Dimensions (ft)	Area (ft^2)	Comment
23 PL 13	Steed-Kisker				
	House 1	Sub-square	20 x 21	420	
	House 2	?	?	?	
	House 3	Oval/Square	22 x 21	462	Incomplete
23 PL 48	Gresham	Rectangular	22 x 14	308	
23 PL 54	McClarnon	Square	22 x 22	484	
23 BN 2	Colverdale	Rectangular	16 x 13	208	
23 CL 113	Friend & Foe				
	House 1	?	15 x 16	240	Arbitrary
	House 2	Sub-rectangular	17 x 16	272	
	House 3	Irregular	?18 x 14	252	Incomplete
23 CL 276	--	Square	36.1 x 36.7	1325.4	Cornerless
14 DP 10	Doniphan				
	House 1	Circular	36' diameter	1018	
	House 2	Circular	12-13' radius	490	Incomplete
14 DP 10	Nuzum	Indeterminate	?	?	Incomplete

DISTRIBUTION OF NEBRASKA PHASE HOUSES BY SIZE (FLOOR AREA)
(DATA FROM BLAKESLEE AND CALDWELL 1979)

Hundreds of Square Feet	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	2600	Total
N:	2	2, 4	14	4, 3	1			2, 5	1	1, 4	1 1			1	1	1	48

Table 8-8

SOLSTICIAL RISING AND SETTING AZIMUTHS OF THE SUN FOR A.D. 1000 AND A.D. 1500 AT SITE 23 CL 276

	Lat. 39° N, Zero degree horizon				Lat. 40° N, Zero degree horizon			
	A.D. 1000		A.D. 1500		A.D. 1000		A.D. 1500	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set
Summer								
First Gleam	58° 18'	301° 42'	58° 12'	301° 48'	57 46	302 14'	57 40	302 2[illegible]
Center of Sun	58° 32'	301° 28'	58° 26'	301° 34'	58 01	301 59	57 55	302 05
Sun tangential	58° 46'	301° 14'	58° 40'	301° 20'	58 15	301 45	58 09	301 51
Winter								
First Gleam	120° 14'	239° 46'	120° 20'	239° 40'	120 42	239 18	120 48	239 12
Center of Sun	120° 28'	239° 32'	120° 33'	239° 27'	120 56	239 04	121 02	238 58
Sun tangential	120° 41'	239° 19'	120° 47'	239° 13'	121 11	238 49	121 17	238 43

Calculations: For Azimuths at Site 23 CL 276 (39° 24' N)

A.D. 100 — **First Gleam**

39° 58° 18'
40° 57° 46'

$$32' \times (^{24}/60) = 8' + 57°\ 46' = 57°\ 54'\ (\pm\ 58°)$$

A.D. 1000 — **Sun tangential**

39° 58° 46'
40° 58° 15'

$$31' \times .4 = 7.75' + 58°\ 15' = 58°\ 23'\ (\pm\ 58.5°)$$

$$\text{*correction for 1° horizon} = \frac{1.0}{59.5°}$$

Summer solstice sunrise azimuth

*A 3° horizon adds 3°'s to easterly azimuths and subtracts 3° from westerly azimuth; a 1° horizon is estimated to add or subtract one degree to or from the azimuths.

Table 9-1

COMPARISON OF RADIOCARBON DATES FROM NEBRASKA PHASE AND STEED-KISKER PHASE SITES

A.D. B.P.	750 1200	850 1100	950 1000	1050 900	1150 800	1250 700	1350 600	1450 500	1550 400	1650 300	A.D. B.P.
Nebraska		L	St	M	N		Td St L	Cm	N	N	
Phase			A		H	Mp F	H	F Z Mp			Mp
Dates*						Sh		C C			
						Lp		Fp		Fp	
						R R		R Sc			
Kansas City											
Area Steed-		S^3	S^M	S^P	S^M	S^P					
Kisker Dates#			G		Y	Mc	V				
Smithville	RH^5				RH^4 RH^5		RH^6				
Lake S-K				CR CR CR							
Dates@	B	FF^3		FF^2	FF^3 FF^1						

SITE IDENTIFICATION KEY:

[The location of a site's identification initials approximates a single, uncorrected C14 date.]

Nebraska Culture Sites:

A: Ashland site (25 CC 1)
C: Cass site (25 CC 96)
Cm: Cornish Meadows site (25 SY 2)
F: Farnsworth site (25 SY 1)
Fp: Frank Parker site (25 WN 1)
H: Houston site (25 BT 1)
L: Leary site (25 RH 1)
Lp: Little Pony site (13 ML 216)
M: Majors site (25 NH 2)
Mp: Minnie Parker site (25 DO 2)
N: Nuzum site (14 DP 10)
R: Ross site (25 TS 2)
Sc: Schrader site (25 LC 1)
Sh: Steinheimer site (13 ML 222)
St: Stonebrook site (13 ML 219)
Td: Theodore Davis site (25 CC 17)
Z: Zessen site (25 CC 44)

Steed-Kisker Phase Sites (general Kansas City area):

S: Steed-Kisker site (23 PL 13): S^3 = House 3; S^M = Midden; S^P = Trash Pit.
G: Gresham site (23 PL 48)
Mc: McClarnon site (23 PL 54)
V: Vandiver Mound C (23 PL 6)
Y: Young site (23 PL 4)

Smithville Lake Steed-Kisker Phase Sites:

CR: Chester Reeves Mound (23 CL 108)
RH: Richardson Hulse site (23 CL 109): RH^4 = Fea. 4; RH^5 = Fea. 5; RH^6 = Fea. 6.
FF: Friend and Foe site (23 CL 113): FF^1 = House 1; FF^2 = House 2; FF^3 = House 3.
B: Butcher site (23 CL 118)

* From Blakeslee and Caldwell 1979: 22, Table 1.
\# From Shippee 1972: 8, Table 1.
@ From O'Brien 1977: 82 and 92, and Calabrese 1969: 65 and 189.

Table C-I

ARTIFACTS FROM 23 CL 279

Prehistoric

Pottery

10 Grit-tempered Sherds (body)

Lithic Implements

7 Projectile Points and fragments

3 Bifaces

1 Gouge

4 Utilized Flakes

2 Axes (1 fragement)

123 Flakes

21 Cores

Historic

1 Rusty - 1 Metal nut

Cans, bottles, and wood were observed but not collected from surface.

ARTIFACTS FROM EXCAVATION UNITS

Excavation Units	Artifacts Recovered
N997 E198	4 Flakes
N980 E180	2 Flakes, 1 Historic nut (98.21-97.74 ele.)
N991 E197	1 Flake
N994 E200	1 Biface, 2 Flakes
N990 E191	1 Flake

Table C-1
(Continued)

Excavation Units	Artifacts Recovered
N1000 E197	1 Potsherd
N984 E194	1 Flake
N981 E195	7 Potsherds, 4 Flakes
N976 E197	1 Core
N976 E200	2 Flakes
N976 E202	1 Flake
N990 E200	1 Core, 3 Flakes
N985 E200	5 Flakes
N981 E200	1 Core, 4 Flakes
N978 E201	1 Flake
N985 E191	1 Core, 1 Flake
N962 E196	1 Core

LIST OF ARTIFACTS FROM CONTROLLED SURFACE SURVEY

Area A N1004-N1000	2 Flakes
Area B N1000-N995	5 Cores, 19 Flakes
Area C N995-N990	2 Cores, 18 Flakes
Area D N990-N985	3 Cores, 2 Utilized Flakes, 13 Flakes
Area E N985-N980	5 Cores, 26 Flakes
Area F N980-N975	1 Core, 8 Flakes
Area G N975-N976	5 Flakes

Table C-2

MEASUREMENTS, CHERT TYPES AND PROVENIENCE OF PROJECTILE POINTS, GOUGE AND AXE FROM SITE 23 CL 279

Description	Cat.#	Chert	Color	Wt.	Length	Width	Thick	Provenience	Remarks
Lanceolate	196	W2	10YR7/2	12.0	65.4	20.9	9.8	Surface	Complete (Plate 6.3:a)
Lanceolate	197	W2	10YR6/4	10.8	72.6	19.2	7.8	Surface	Complete (Plate 6-3:d)
Lanceolate	198	W2	10YR7/2	10.2	69.6	17.8	9.2	Surface	Complete (Plate 6-3:b)
Lanceolate	70	W2	10YR7/3	7.6+	57.8+	15.3	18.6	Surface	Distal end missing (Plate 6.3:k)
Lanceolate?	44	W2	10YR7/3	6.3+	47.0+	20.0+	8.9+	N979.95 E144.88 Surface	Base missing (not illustrated)
Lanceolate	71*	?	2.5YR6/4	11.4+	48.6	21.4	12.1	N967.38 E198.46 Surface	Base broken (Plate 6-3:m)
Corner-Notched	39	?	5YR/7/2	10.0	38.4	35.4	8.8	N985.87 E200.38 96.70	Complete (Plate 6-1:y)
Narrow, thick Biface ("Sedalia Digger")	260	W2	10YR7/3	73.0	95.4	35.6	20.5	Surface	Fragmentary (Plate (Plate 6-4:h)
Celt	204	NT	5 Y 4/1	233.3	129.0	51.2	19.2	N997.31 E201.33 Surface	Complete (Plate 6-5:a)
Axe	195	?	10YR4/1	304.0+	85.0+	63.4+	46.0+	Surface	Proximal end missing

+Broken - Affects Measurement
*Indicates thermal pretreatment
Measurements and weights in millimeters and grams, respectively.

Table C-3

COMPARISONS OF METRICAL ATTRIBUTES OF LANCEOLATE PROJECTILE POINTS FROM SITES 23 CL 279, 23 CL 11, and 14 PO 1

	Site				
	23 CL 279		23 CL 11[a]		14 PO 1[b]
N	3		39		1
	$\bar{X}$	s.d.	$\bar{X}$	s.d.	
Length (mm)	69.20	3.61	78.33	16.29	80.1
Width (mm)	19.30	1.55	19.36	2.97	20.0
Thickness (mm)	8.93	1.02	9.60	1.49	-

[a]Reid (1978: 89ff)

[b]Schmits (1978: 11) approximate measurements

COMPARISONS OF METRICAL ATTRIBUTES OF CORNER-NOTCHED PROJECTILE POINTS FROM SITES 23 CL 279, 23 CL 11, and 14 PO 1

	Site				
	23 CL 279	23 CL 11[a]		14 PO 1[b]	
N	1	2		2	
Length (mm)	38.4	54.2	25.2	52.0	32.0
Width (mm)	35.4	36.4	19.2	37.0	25.0
Thickness (mm)	8.8	6.2	4.4	-	-
Weight (gms)	10.0	11.0	1.8	-	-

[a]Reid (ibid.: 118)

[b]Schmits (ibid.: 110) approximate measurements

Table D-1

SUMMARY OF CLAY MINERALOGICAL ANALYSES

Sample Description	Test Pit Number*	D.I. Ratio	Percent Montmo-rillonite	Percent Illite	Percent Chlorite	Percent Kaolinite	Percent Mixed-Layered	Factor Analysis Grouping
Peorian loess	See Figure 3-1	1.28	25	40	0	35	0	III
Bignell loess	See Figure 3-1	1.62	60	20	0	20	0	I
Illinoian alluvium	See Figure 3-1	0.81	20	40	0	40	0	III
Kansan till	7	0.45	25	15	0	40	20	II
Upland deposit (shallow)	35	0.85	55	15	0	15	0	I
Upland loess-like deposit (deep)	64	0.71	15	25	0	35	25	II
Upland loess-like deposit (deep)	35	0.58	20	20	0	30	30	II
Midslope ridge alluvium/colluvium overlying till - Figure 3-14	64	1.26	10	40	0	35	15	No grouping best fit between I and III
T_2 terrace (shallow veneer)	80	1.00	50	25	0	25	0	I
T_2 terrace alluvium (deep)	52	0.88	20	30	20	20	10	III
T_1 terrace	59	1.04	45	30	10	15	0	I
T_1 terrace	53	1.28	35	35	15	15	0	I
T_1 terrace	53	[illegible]	60	10	0	30	0	I
Tributary T_1 terrace	45	1.62	50	30	0	20	0	I
Triburary T_1 terrace	45	1.00	55	25	0	20	0	I
Foot-slope deposits below the paleosol	78	1.21	35	20	0	25	20	No grouping best fit Between I and III
Foot-slope deposits above the paleosol	78	0.78	45	25	0	20	10	I

[illegible]
([illegible])

Sample Description	Test Pit Number*	I.I. Ratio	Percent Montmo-rillonite	Percent Illite	Percent Chlorite	Percent Kaolinite	Percent Mixed-Layered	Factor Analysis Grouping
Colluvial deposit in Figure 3-14	[illegible]	0.61	20	[illegible]	[illegible]	35	20	II
T_o terrace (surface)	[illegible]	[illegible]	[illegible]	[illegible]	3	[illegible]	[illegible]	II
T_o terrace (deep)	58	[illegible]	30	30	[illegible]	20	[illegible]	No grouping best fit between I and III

*Test pits refer to those shown on Figures 3-[illegible] and [illegible] unless otherwise noted. Reference data for Test Pits are given on Table [illegible] of Appendix VII.

Table [illegible]

SUMMARY OF MICROTEXTURAL SURFACE CHARACTERISTICS OBTAINED BY S. E. M. ANALYSIS

Test pit Number*	Sample Description	Percentage of Characters Present: Solutioning	Precipitate Rounding	Crystal Overgrowths	Etching	Erosional Rounding	Crystal Plates on Edges	Angular	Conchoidal Fractures	Fresh Angular Breaks	Precipitate Debris on Grains	Loose Debris	Total Grains Counted	V-Shape Notches Present	Crevasse Features Present	Parallel Steps Present	Range of Shape and Surface Coating Characteristics: Equant	Subequant	Subelongate	Elongate	Angular	Subangular	Subround	Round	[illegible]	[illegible]	[illegible]
**	Peorian loess	83	83	0	0	17	[illegible]	25	17	8	[illegible]	43	12	[illegible]		[illegible]		+	[illegible]	[illegible]		+				+	+
**	Bignell loess	89	89	5	[illegible]	21	5	42	16	26	0	43	19	[illegible]		[illegible]	+	+	+	+	+	+	+				+
**	Illinoian alluvium	100	100	0	18	47	35	18	0	0	100	0	17	[illegible]	[illegible]		[illegible]	+	[illegible]	[illegible]	[illegible]	+	+	+		+	
58	T_o terrace (surface)	60	65	15	30	45	10	35	45	20	35	10	2[illegible]	[illegible]	+	+	[illegible]	+	+	+	+	+	+		[illegible]	+	
58	T_o terrace (deep)	82	73	27	9	18	18	54	27	18	45	9	21		[illegible]	[illegible]	[illegible]	+		[illegible]	+			[illegible]	+		
104	T_o terrace (deep)	46	58	0	54	42	17	54	46	4	12	4	24	+	+	+	+		[illegible]	[illegible]	[illegible]	+	+	+	+		
59	T_1 terrace	81	81	19	62	81	56	31	25	12	50	94	16	[illegible]	[illegible]	[illegible]	+	+	+	[illegible]	[illegible]	+	[illegible]			+	
92	T_1 terrace (meander scar)	42	67	0	54	25	17	79	79	8	17	0	24	+	[illegible]	+	[illegible]	+	+	+	+	+	+		+		
35	Upland (shallow)	44	80	0	84	52	0	52	56	4	20	24	25	+	0	[illegible]											
35	Upland loess-like (deep)	83	83	0	48	52	0	43	35	4	56	48	23	+	[illegible]	[illegible]	+	[illegible]	[illegible]		[illegible]	[illegible]	0	+	+		
78	Foot-slope deposit below paleosol	40	92	0	80	48	4	40	56	4	36	40	25	+	0	[illegible]											
78	Tributary T_1 above paleosol	48	78	0	61	61	35	43	26	0	35	13	23	+	0	+	+	+	+	[illegible]	[illegible]	+	+	+		+	
80	T_2 (shallow veneer)	67	86	0	43	52	38	57	33	0	62	57	21	+	0	+	+	+	+	[illegible]	+	+	+	+		+	

*Test pit locations are shown on Figure 3-2a and 3-2b, and are referenced in Table D-6 of Appendix VII.

**Localities for samples shown on Figure 3-1 and are referenced in Table D-8 of Appendix VII.

Table [illegible]

RESULTS OF THE [illegible] COMPARISON [illegible] DATA [illegible]

Associations Made by Analysts	[illegible]*
Bignell loess T_1 terrace deposit	[illegible]
T_0 terrace deposits T terrace deposits	[illegible]
Both T_1 terrace deposits Illinoian alluvium	4
One T_0 terrace deposit Illinoian alluvium	4
Peorian loess bignell loess T_1 terrace deposit	[illegible]
T_0 terrace deposit T_1 terrace deposit	[illegible]
T_1 terrace deposit Illinoian alluvium	[illegible]
Illinoian alluvium not similar to any other samples	4
Peorian loess not similar to any other samples	[illegible]

Key to Number of Samples and Corresponding Test Fit [illegible]

Sample	No. of Samples	Test Fit [illegible]
Peorian loess	1	See Figure 3-1
Bignell loess	1	See Figure 3-1
T_1 terrace	1	[illegible] on Figures 3-2a and 3-2b
T_0 terrace	2	[illegible] on Figures 3-2a and 3-2b
Illinoian Alluvium	1	See Figure 3-1

*Total number of analysts = 10.

Table D-4

DESCRIPTION OF SAMPLE SITES FOR THE INVESTIGATION OF TERRESTRIAL GASTROPODS

Index Number on Figue 3-2b	Field Number	Location by TWP:RNG	General Description of Sampling Locality
M-1	SCB 1	Center of NW 1/4, SEC 16, T53N:R32W	Top of small lowlying ridge protruding onto the valley floor of Camp Branch.
M-2	TR 1	NE 1/4, NW 1/4, SEC 30, T54N:R32W	Top of T_1 terrace and a small tributary on the west side of the Little Platte River
M-3	MBS 1	NE 1/4, SW 1/4, SEC 7, T53N:R32W	Lower to middle valley slope along a small intermittent tributary on west side of Little Platte Valley.
M-4	MBN 1	W 1/2, SE 1/4, SEC 8, T53N:R32W	Middle valley slope on the east side of the Little Platte Valley adjacent to tributary gully.
M-5	MBN 2	SW 1/4, NW 1/4, SEC 8, T54N:R32W	Similar setting as M-4 but adjacent to the next tributary gully to the north.
M-6	MBS 2	SW 1/4, SE 1/4, SEC 7, T53N:R32W	Top of T_2 terrace on west side of Little Platte River.
M-7	CCOX	NW 1/4, SW 1/4, SEC 19, T53N:R32W	Meander scar deposits excavated by backhoe. Same location where wood and pollen samples were obtained.
M-8	CB 1	SE 1/4, NE 1/4, SEC 11, T53N:R32W	Surface sampled along banks of small tributary to Camp Branch.
M-9	WLP 5	NE 1/4, NW 1/4, SEC 18, T53N:R32W	Upper valley slope along west side of Little Platte Valley.

Table [illegible]

DISTRIBUTION OF MOLLUSCAN SPECIES

Field Designation and Index Designation on Figure [illegible]

Species	SCRI M-1	SCRI (1-6) M-[illegible]	SCRI (6-10) M-[illegible]	MBSI ([illegible]) M-[illegible]	MBSI (1-6) M-3	MBSI (6-10) M-3	MBSI ([illegible]) M-[illegible]	MBS2 M-[illegible]	[illegible] M-2	TRI (0-1) M-[illegible]	MBN1 M-4	MFN2 M-5	WPL5 M-9	CCOX (0-1) M-7	CCOX* M-7	Total
Anguispira alternata (Say)	12							15	13		5	70	24			122
Anguispira alternata angulata (Pilsbry)								12			1	6				21
Carychium exile canadense Clapp	3															3
Deroceras sp.									1							1
Gastrocopta armifera (Say)	1															1
Gastrocopta procera (Gold)				1									1			2
Gastrocopta rupicola (Say)	1												1			2
Gastrocopta (vertigopsis) pentodon (Say)								2								2
Gastrocopta contracta (Say)	2	1									1					4
Hawaiia minuscula (Binney)	4															4
Helicodiscus singleyanus (Pilsory)										1						1
Helicodiscus parallelus (Say)	6	1							1	1	16					25
Mesodon clausus (Say)	1							6	6							13
Mesodon appressus (Say)								3								3
Mesomphix Cf. M. nulgatus Baker								3								3
Nesovitera inocatata (Say)	3	1						5	3							12
Nesovitrea electrina (Say)								2	2		[illegible]		1			12
Physa sp.															3	3
Strobilops aenea Pilsbry											1					1
Strobilops labyrinthica (Say)				2			1	2								5
Stenotrema hirsutum (Say)	8							11	8			1	1			29
Stenotrema fracternum (Say)	1			1				12			5	5	2			26
Succinea Cf. S. ovalis (Say)								1		1				1		3
Succinea grosvenori Lea	1															1
Succinea gelida (Baker)	2															2
Triodopsis albolabris (Say)	1							8	1			45				55
Ventridens sp.	2										1					2
Vertigo gouldi? (Binney)	1															1
Zonitoides arboreus (Say)									1							1
Sphacriacean clams															3	3
genus indeterminate								2	1							3
Unindentifiable juveniles and fragments	2			3												5
Snail eggs								1			1					2
TOTAL	51	3	0	7	0	0	1	86	37	3	38	129	30	1	6	373

*Surface pick.

Table [illegible]

GEOLOGIC TEST PIT DATA OBTAINED FOR THE GEOLOGIC AND GEOMORPHIC INVESTIGATION

Pit Number	Field Designation	Approximate Surface Elevation (ft-msl)	Landform Location	Depth of Samples Tested (M)	Generic Classification of Sample	Tests Conducted on Samples: Clay Mineralogy	Particle Size	S.E.M.	C14 Age-Date
1	CCox-1	822	T_o meander scar						
2	CCox-2	822	T_o meander scar	1.[illegible]	Meander scar alluvium				X
3	NC-1-1	875	Upland ridge						
4	NC-1-2	865	Upland ridge						
5	NC-1-3	875	Upland ridge						
6	NC-1-4	862	Upland ridge						
7	NC-1-5	855	Upland ridge	1.1	Kansan glacial till	X	X		
8	NC-1-6	850	Upper slope						
9	NC-1-7	838	Middle slope						
10	NC-1-8	832	Lower slope						
11	NC-1-9	848	Middle slope						
12	NC-1-10	835	Lower slope						
13	NC-1-11	825	T_1 terrace						
14	CB-1-1	855	T_o terrace						
15	CB-1-2	862	T_1 terrace						
16	CB-1-3	862	T_1 terrace						
17	CB-1-4	865	Lower slope						
18	CB-1-5	875	Middle slope						
19	CB-1-6	895	Upland						
20	CB-1-7	895	Upland						
21	ELP-1-1	835	Lower slope						
22	ELP-1-2	848	Lower slope						
23	ELP-1-3	854	Middle slope						
24	ELP-1-4	863	Upper slope						
25	ELP-1-5	876	Upland						
26	ELP-1-6	863	Upper slope						
27	ELP-1-7	850	Middle slope						
28	ELP-1-8	830	Lower slope						
29	ELP-1-9	821	T_o terrace						
30	ELP-1-10	820	T_o terrace						
31	ELP-1-11	819	T_o terrace						
32	ELP-1-12	893	Upland						
33	ELP-1-13	875	Upper slope						
34	WLP-1-1	902	Upland						
35	WLP-1-2	881	Upland	.40	Loess	X		X	
			Upland	2.	Loess-like	X	X	X	

Pit Number	Field Designation	Approximate Surface Elevation (ft-msl)	[illegible]	[illegible]	[illegible]		Clay Mineralogy	Particle Size	S.E.M.	C14 Absolute
							Tests Conducted on Samples			
36	WLP-1-3	[illegible]	Lower slope							
37	WLP-1-4	833	Tributary T							
38	WLP-1-5	833	Tributary T							
39	WLP-1-6	[illegible]	Middle slope ridge							
40	WLP-1-7	862	Middle slope ridge							
41	WLP-1-8	840	Tributary T							
42	WLP-1-9	828	Tributary stream bottom							
43	WLP-1-10	83[illegible]	T terrace							
44	WLP-1-11	83[illegible] to 8[illegible]	T_1 to T_2 terrace							
45	WLP-1-12	825	Tributary T_1 terrace	[illegible]	Loessial alluvium		[illegible]	[illegible]		
			Tributary T_1 terrace	[illegible]	Loessial alluvium		x	[illegible]		
46	WLP-1-13	82[illegible]	Tributary T_1 terrace							
47	WLP-1-14	838	Tributary T_1 terrace							
48	WLP-1-15	852	Lower slope							
49	WLP-1-16	870	Middle slope							
50	WLP-1-17	882	Upper slope							
51	WLP-1-18	840	Tributary T_1 terrace							
52	WLP-1-19	832	T_2 terrace	1.30	Alluvium		x	x		
53	WLP-1-20	820	T_1 terrace	1.00	Loessial alluvium		x	x		
			T_1 terrace	2.00	Loessial alluvium		x	x		
54	WLP-1-21	817	T_1 terrace							
55	WLP-1-22	82[illegible]	T_0 terrace							
56	WLP-1-23	821	T_1 terrace							
57	WLP-1-24	82[illegible]	T_1 terrace							
58	WLP-1-25	819	T_0 terrace	Ground surface	Alluvium		x	x	x	
			T_0 terrace	0.5	Alluvium		x	x	x	
59	WLP-1-26	821	T_1 terrace	2.6	Loessial alluvium		x	x	x	
60	WLP-1-27	822	T_1 terrace							
61	WLP-1-28	82[illegible]	T_1 terrace							
62	WLP-1-29	82[illegible]	T_1 terrace							
[illegible]3	ELP-2-1	85[illegible]	Lower slope							
64	ELP-3-1	862	Middle slope (ridge)	1.3	Loess (?)		x	x		

Table D-[illegible]
(Continued)

Pit Number	Field Designation	Approximate Surface Elevation (ft-msl)	Landform Location	Depth of Samples Tested (M)	Generic Classification of Sample	Tests Conducted on Sample: Clay Mineralogy	Particle Size	S.E.M.	C14 Age-Date
65	ELP-3-2	860-850	Middle slope (ridge)						
66	ELP-3-3	862	Middle slope (ridge)						
67	ELP-3-4	855 to 850	Middle slope						
68	ELP-3-5	848 to 830	Lower slope to T_1 surface						
69	ELP-3-6	883	Middle slope (ridge)						
70	ELP-3-7	894	Upper slope (ridge)						
71	ELP-3-8	845	Lower slope (ridge)						
72	ELP-3-9	838 to 828	Lower slope to T_1 terrace						
73	ELP-3-10	825	T_1 terrace						
74	ELP-3-11	822	T_1 terrace to T_o terrace						
75	ELP-3-12	819	T_o terrace						
76	ELP-3-13	883	Middle slope (ridge)						
77	ELP-3-14	870	Middle slope (bluff top)						
78	ELP-3-15	867 to 830	Middle slope (ridge)	1.20	Alluvium and/or colluvium overlying till	X	X		
			Slope	1.00	colluvium	X	X		
			Foot slope deposits on tributary T_1 terrace	1.15	Loessial/colluvium above paleosol	X	X	X	
			Paleosol on tributary T_1 terrace	2.15	Paleosol (buried soil horizon)				X
			Foot slope deposit on tributary T_1 terrace	2.80	Loessial/colluvium below paleosol	X	X	X	
79	WLP-2-1	842	T_1 terrace						
80	ELP-4-1	844	T_2 terrace	2.0	Loess	X	X	X	

Table 1-[illegible]
(Continued)

Pit Number	Field Designation	Approximate Surface Elevation (ft-msl)	Landform Location	Depth of Samples Tested (M)	Generic Classification of Sample	[illegible] Sample			
						[illegible]	[illegible]	S.E.M.	C14 Age-Date
81	ELP-4-2	842	T_2 terrace						
82	2290X-1	852	T_3 meander scar						
85	DT-3	843	T_1 meander scar	3.0	T_1 alluvium			X	
104	DT-22	838	T terrace	2.	Alluvium			X	

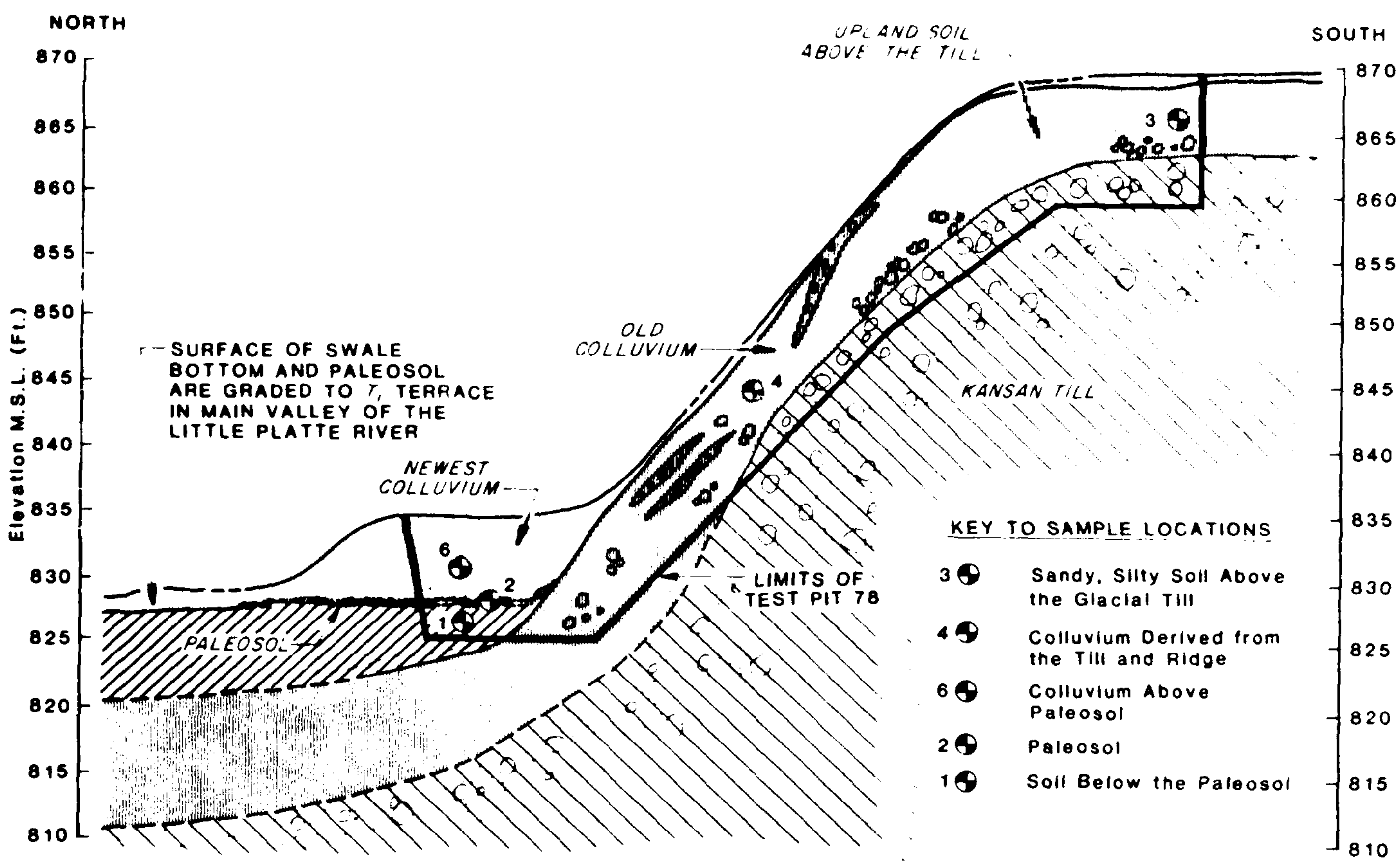


FIGURE 3-14 GENERALIZED GEOLOGIC CROSS-SECTION OF TEST PIT 78 AND HILLSLOPE ON A TRIBUTARY SWALE OF THE LITTLE PLATTE VALLEY
(see Figure 3-2a and 3-2b for location, and Appendix D-VII, Table D-7 for other data)

Table D-7

SUMMARY OF TEST PIT DATA FOR DEEP-TESTING POTENTIAL LOCALITIES OF BURIED ARCHAEOLOGICAL SITES

Test Pit Number	Field Designation	Deep Test Locality and Township and Range	Approximate Surface Elevation (ft-msl)	Landform Association
83	DT-1	Locality I - SE 1/4, Sec. 19	841	T_1 meander scar
84	DT-2	T54N:R32W	838	T_1 meander scar
85	DT-3	"	843	T_1 point bar
86	DT-4	"	845	T_1 point bar
87	DT-5	"	846	T_1 point bar
88	DT-6	"	843	T_1 point bar
89	DT-7	"	838	T_1 point bar
90	DT-8	"	839	T_1 point bar
91	DT-9	"	837	T_1 meander scar
92	DT-10	"	839	T_1 meander scar
93	DT-11	"	841	T_1 natural levee
94	DT-12	"	842	T_1 natural levee
95	DT-13	"	842	T_1 natural levee
96	DT-14	"	842	T_1 natural levee
97	DT-15	"	842	T_1 natural levee
98	DT-16	"	842	T_1 natural levee
99	DT-17	"	844	T_1 natural levee
100	DT-18	"	845	T_1 natural levee
101	DT-19	"	845	T_1 natural levee
102	DT-20	"	842	T_1 natural levee
103	DT-21	"	840	T_1 natural levee
104	DT-22	"	835	T_0 terrace
105	DT-23	"	841	T_1 natural levee
106	DT-24	Locality II - NE 1/4, SEC. 19	842	T_1 natural levee
107	DT-25	T54N:R32W	842	T_1 natural levee
108	DT-26	"	842	T_1 natural levee
109	DT-27	"	840	T_1 meander scar
110	DT-28	"	843	T_1 point bar
111	DT-29	"	842	T_1 point bar
112	DT-30	"	840	T_1 point bar
113	DT-31	"	838	T_1 point bar
114	DT-32	Locality III - NE 1/4, Sec. 19	860	Colluvial cone on T_1 terrace
115	DT-33	T54N:R32W	857	Colluvial cone on T_1 terrace
116	DT-34	"	853	Colluvial cone on T_1 terrace
117	DT-35	"	850	Colluvial cone on T_1 terrace
118	DT-36	"	847	Colluvial cone on T_1 terrace
119	DT-37	"	844	T_1 terrace
120	DT-38	"	843	T_1 terrace

Table D-7
(Continued)

Test Pit Number	Field Designation	Deep Test Locality and Township and Range	Approximate Surface Elevation (ft-msl)	Landform Association
121	DT-39	"	852	Colluvial cone on T_1 terrace
122	DT-40	"	852	Colluvial cone on T_1 terrace
123	DT-41	"		Colluvial foot-slope on T_1 terrace
124	DT-42	"	854	Colluvial foot-slope on T_1 terrace
125	DT-43	"	855	Colluvial foot-slope on T_1 terrace
126	DT-44	"	850	Colluvial foot-slope on T_1 terrace
127	DT-45	"	850	Colluvial foot-slope on T_1 terrace
128	DT-46	"	845	T_1 meander scar
129	DT-47	"	846	T_1 meander scar
130	DT-48	"	848	T_1 meander scar
131	DT-49	Locality IV - SW 1/4, Sec. 16	885-875	Hilltop overlooking T_1 terrace
132	DT-50	T54N:R32W	885-848	Hilltop, slope, T_1 terrace
133	DT-51	"	848-835	Bank of T_1 terrace - T_0 terrace
134	DT-52	"	850	Colluvial foot-slope
135	DT-53	"	855-848	Colluvial foot-slope
136	DT-54	"	855-848	Colluvial foot-slope
137	DT-55	"	875	Hilltop overlooking T_1 terrace
138	DT-56	Locality V - SW 1/4, Sec. 9	890	Bluff overlooking T_1 meander scar
139	DT-57	T54N:R32W	857	T_1 meander scar
140	DT-58	"	867	Bluff overlooking T_1 meander scar
141	DT-59	"	860	T_1 slope onto T_0
142	DT-60	"	865	T_1 slope on T_0
143	DT-61	"	860	T_1 point bar
144	DT-62	"	860	T_1 point bar (?)
145	DT-63	"	868	T_1 natural levee (?)
146	DT-64	Locality VI - NW Corner, Sec. 31 T54N:R32W	855-845	Colluvial foot-slope on T_0 terrace
147	DT-65	"	855-848	Colluvial foot-slope on T_0 terrace
148	DT-66	"	880-875	Colluvial foot-slope on T_0 terrace
149	DT-67	"	870-860	Colluvial foot-slope on T_0 terrace
150	DT-68	"	855-848	Colluvial foot-slope on T_0 terrace
151	DT-69	"	844	T_0 terrace
152	DT-70	Locality VII - SW 1/4, Sec. 30	841	T_1 terrace overlooking river
153	DT-71	T54N:R32W	842	T_1 terrace overlooking river
154	DT-72	"	842	T_1 terrace
155	DT-73	"	842	T_1 terrace

Test Pit Number	Field Designation	[illegible]
156	DT-[illegible]4	"
15[illegible]	DT-[illegible]	"
15[illegible]	DT-[illegible]	"
159	DT-[illegible]	Locality VIII - [illegible] 4, [illegible] Sec. [illegible], T[illegible]N, R[illegible]W
160	DT-[illegible]	Locality IX - [illegible]W [illegible] 4, [illegible] Sec. [illegible], T[illegible]N, R[illegible]W
161	DT-[illegible]	"
162	DT-[illegible]	"

Table [illegible]

LOCATION AND DESCRIPTION OF SAMPLING LOCALITIES BEYOND THE LITTLE PLATTE VALLEY

Sample Description (see Figure 3-1 for location)	Location by TWP:RNG and 7.5' Topographic Quadrangle	Elevation of Ground Surface (ft-msl)	Description of Sampling Location	Depth of Sampling (M)	Reference Pages in Davis (1955)
Peorian loess	SW 1/4, NE 1/4, Sec. 26 T52N:R23W (Ferrelview Quad.)	1045	Sample obtained by augering into a small tree covered knoll, about 25 meters east of gravel road	1.5	Page 209
Bignell loess	SE 1/4, NW 1/4, Sec. 30 T53N:R35W (Weston Quad.)	915	Sample obtained from bluff of Missouri River above a small quarry area	1.6	Pages 135-144
Illinoian alluvium	NW 1/4, SW 1/4, Sec. 17 T54N:R36W (Weston Quad.)	[illegible]	Sample obtained from stream-cut bluff on east side of stream, about 60 meters south of the road	[illegible]	Page 220

Table D-[illegible]

BORING DATA OBTAINED FOR THE GEOLOGIC AND GEOMORPHIC INVESTIGATIONS OF THE LITTLE PLATTE VALLEY

Boring Number**	Field Designation	Approximate Elevation of Ground Surface (ft-msl)	Landform Feature	Depth of Boring (M)	Depth to Bedload Deposits* (M)
B-1	ELP-1-$T_1$1	817	T_0 terrace meander scar	6.2	5.5
B-2	ELP-1-$T_0$2	817	T_0 terrace meander scar	6.3	5.5
B-3	WLP-4-$T_1$1	835	T_1 terrace meander scar	1[illegible].1	9.8
B-4	WLP-4-$T_1$2	835	T_1 terrace meander scar	9.4	Not penetrated

*Bedload deposits are those transported primarily by traction along the bottom of the channel. These deposits are usually in the sand to gravel size range. In the Little Platte River, the bedload deposits are those composed primarily of sand.

**See Figure 3-2b for locations.

APPENDIX J

FIGURES

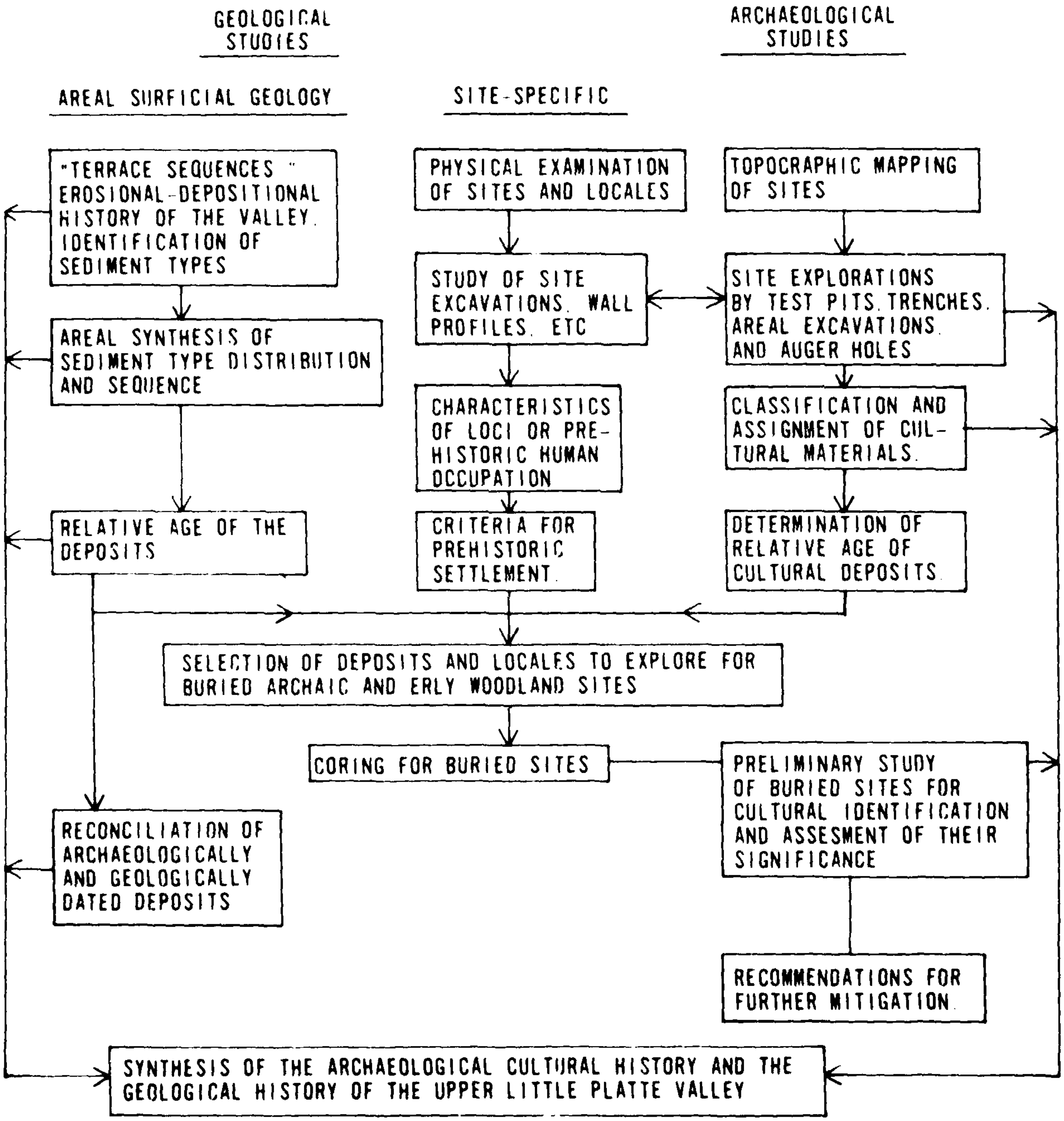
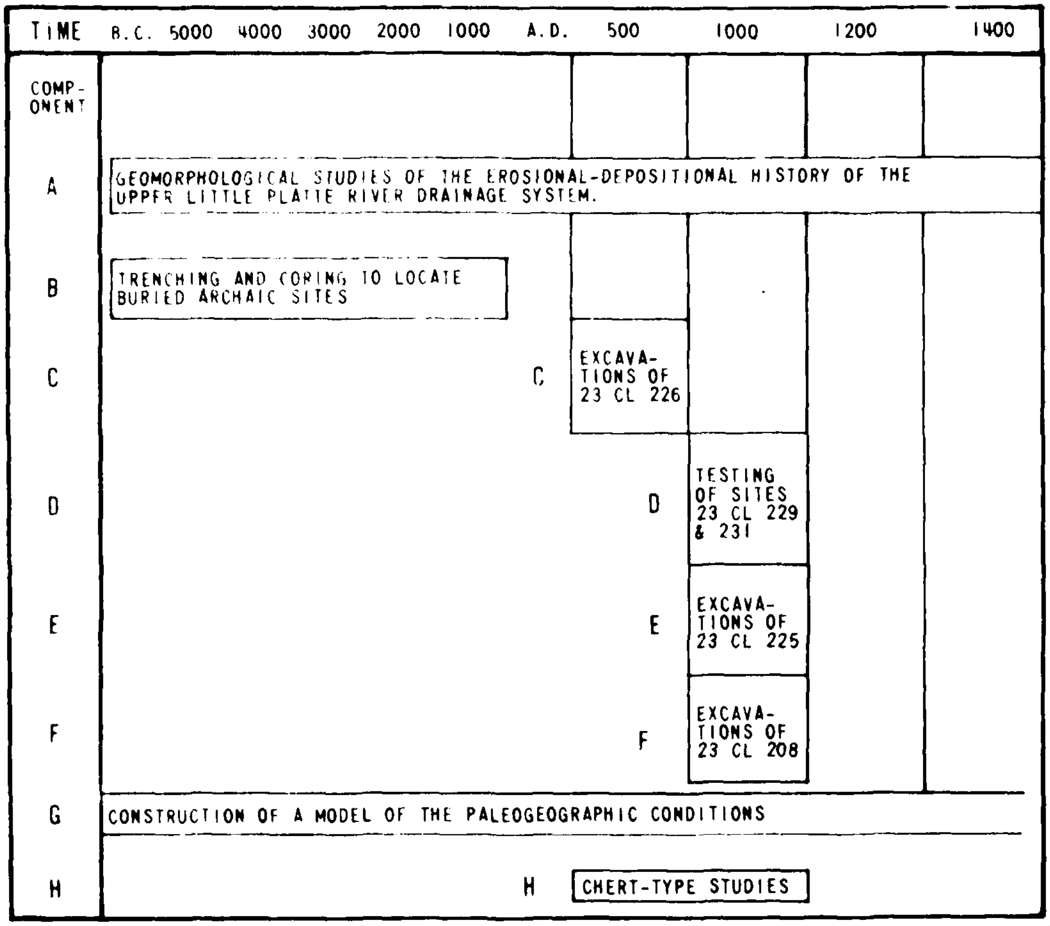


FIGURE 1-1 - FLOW CHART FOR THE COMBINED GEOLOGICAL AND ARCHAEOLOGICAL STUDIES



ESTIMATED PROPORTIONAL AMOUNT OF EFFORT TO BE SPENT COMPLETING VARIOUS FIELD STUD COMPONENTS IDENTIFIED ABOVE

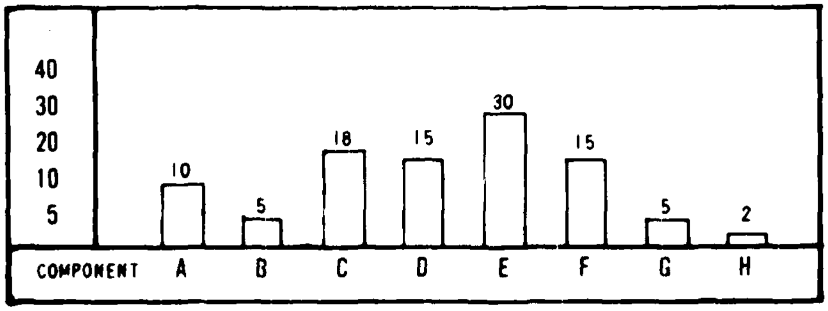
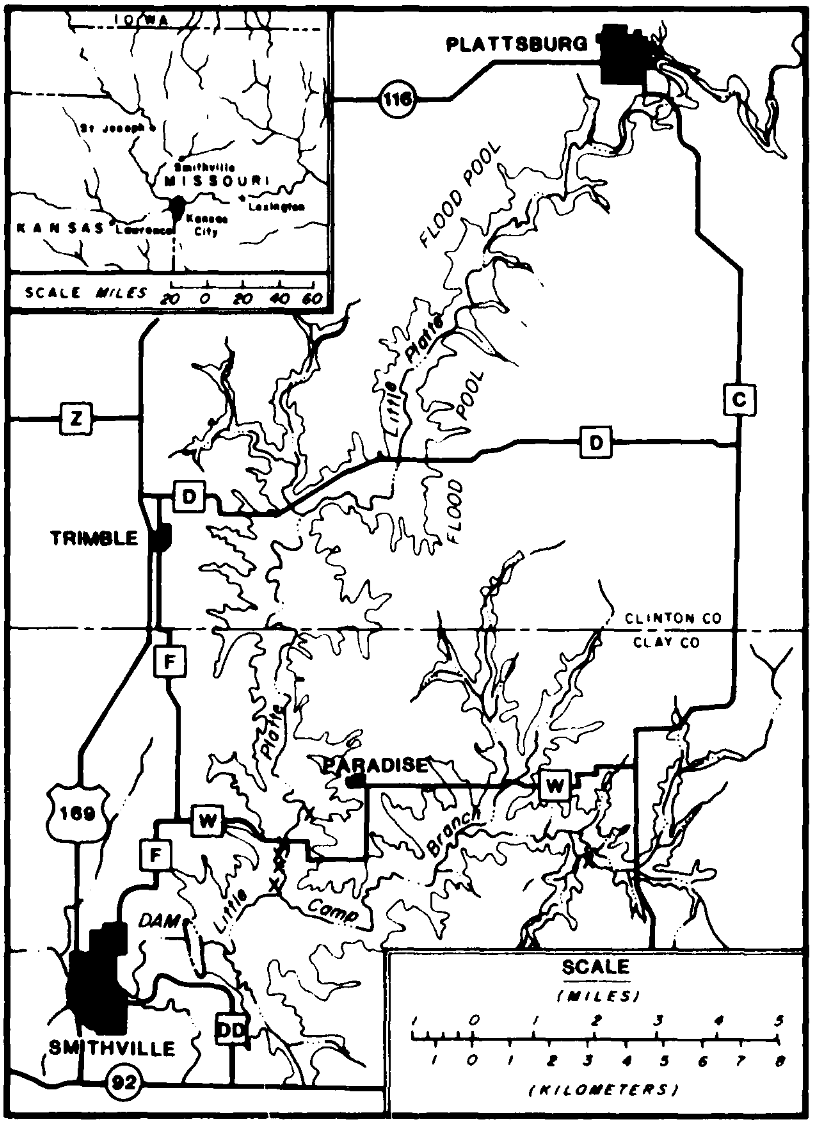


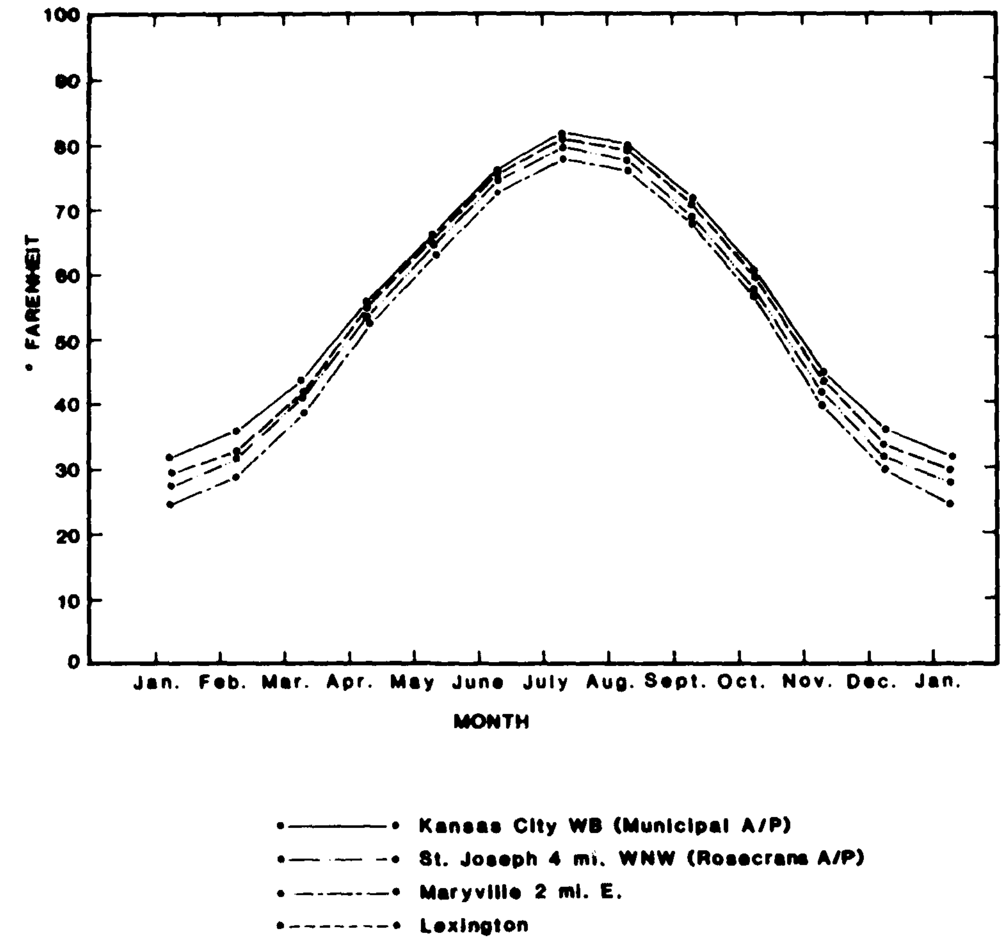
FIGURE 1-2 - POSITION IN TIME SCALE FIELD STUDY COMPONENT OCCUPIES



LEGEND

X Archeological sites investigated by GAI Consultants, Inc.

FIGURE 2-1 MAP OF SMITHVILLE LAKE AREA



(Data from McQuigg 1969: 732;
period of observation not given.)

FIGURE 2-2 AVERAGE MONTHLY MEAN TEMPERATURES FOR FOUR STATIONS IN NORTHWEST AND WEST CENTRAL MISSOURI

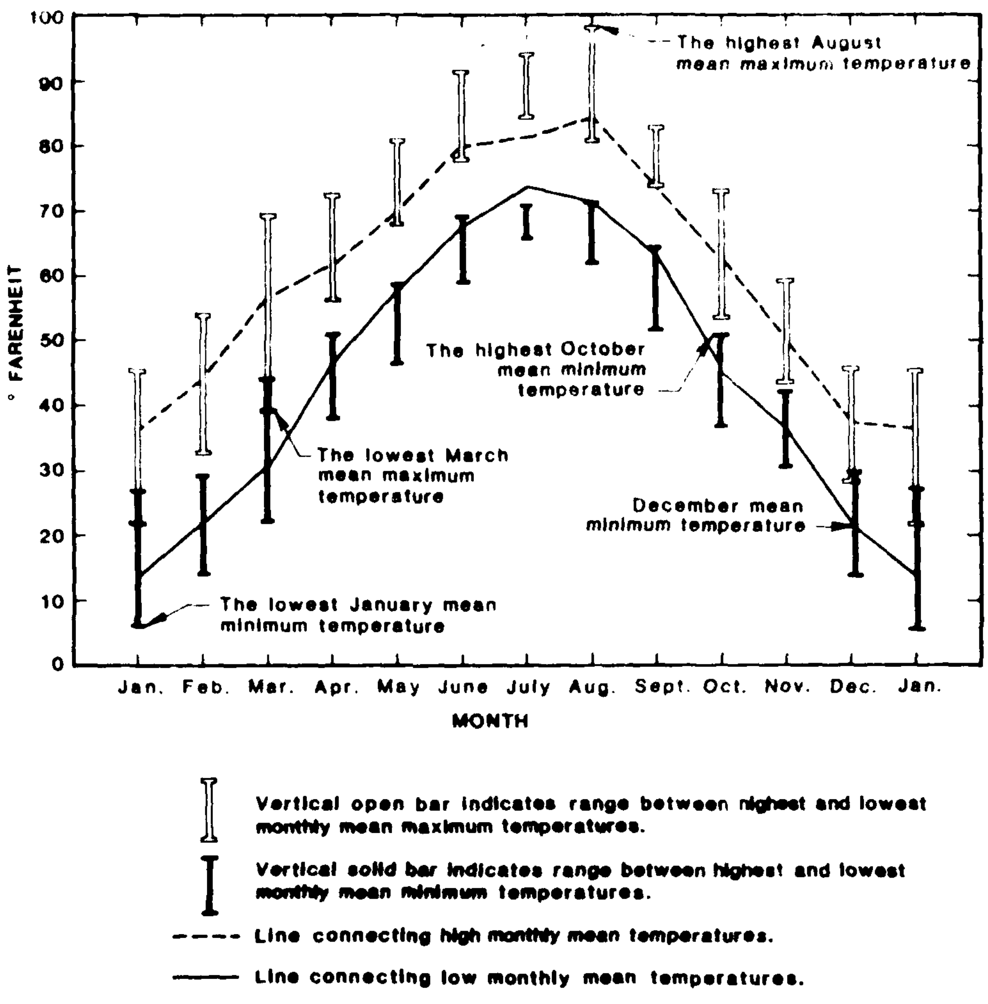


FIGURE 2-3 EXTREME MINIMUM AVERAGE AND EXTREME MAXIMUM AVERAGE MONTHLY TEMPERATURES AT ST. JOSEPH, MISSOURI, 1910-1930

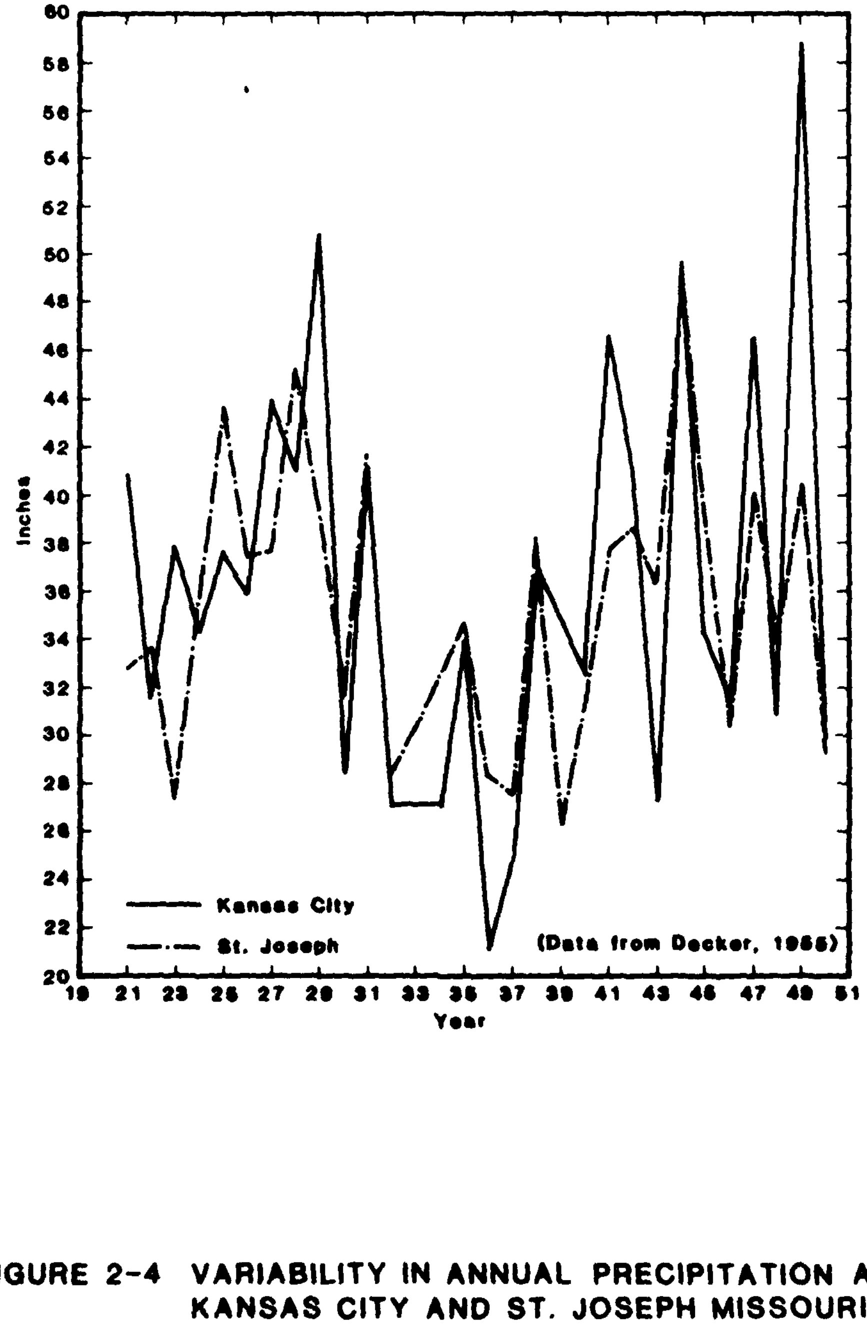


FIGURE 2-4 VARIABILITY IN ANNUAL PRECIPITATION AT KANSAS CITY AND ST. JOSEPH MISSOURI, FOR THE PERIOD 1921 TO 1950

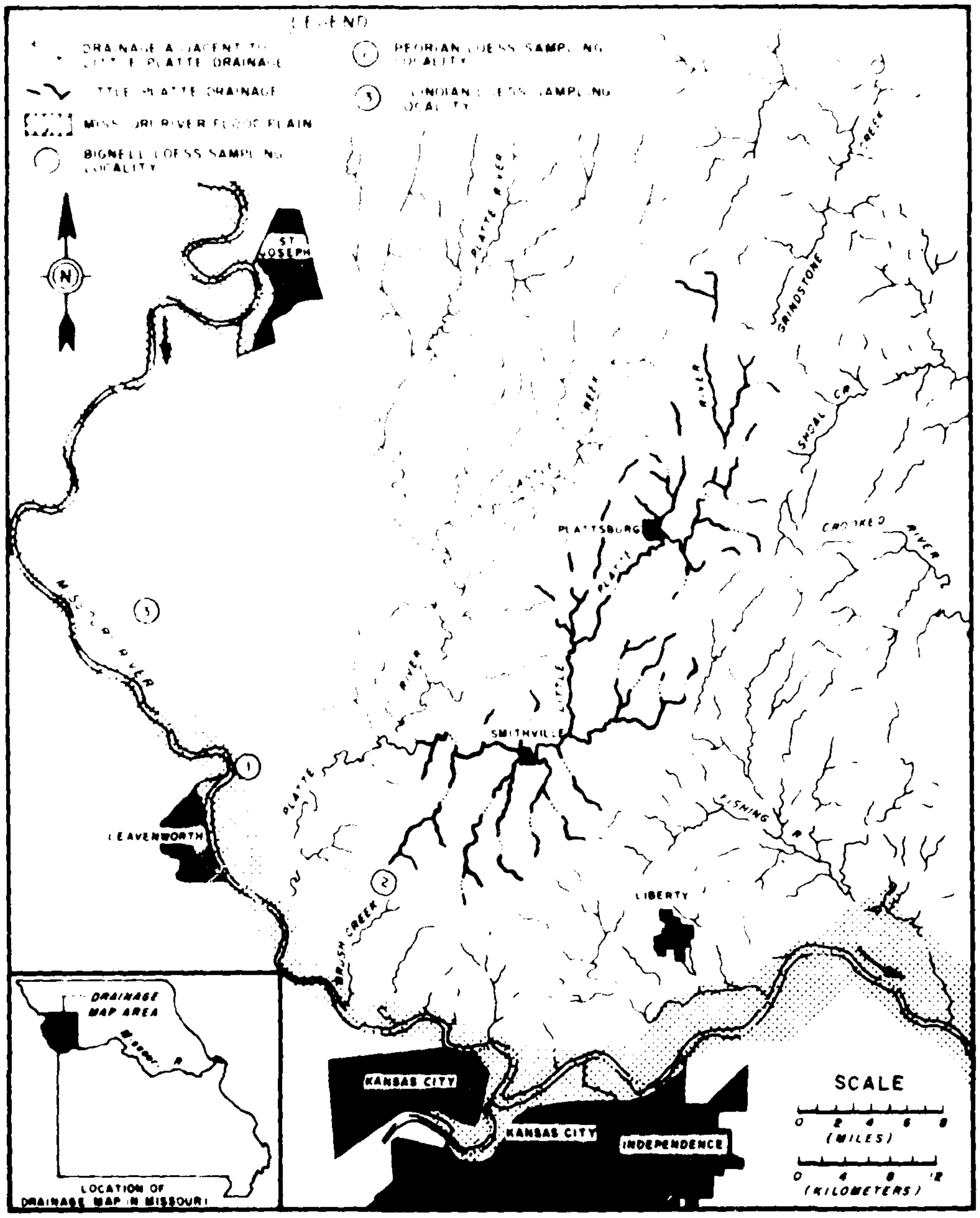


FIGURE 3-1 DRAINAGE MAP OF THE LITTLE PLATTE RIVER AND VICINITY (See Appendix D-7 for detailed descriptions of sampling localities)

FIGURE 3 2a LEGEND

SCALE

Corps of Engineers Boring Data

GAI Test Pit and Number (See Appendix D VII and Tables D 1 and D 2 for Reference Data)

GAI Boring (See Appendix D VII and Table D 9 for Reference Data)

Corps of Engineers Sediment Range Profile of the Ground Surface

Missouri State Highway Commission Boring Data (Boring Locations Not Shown)

Corner Point of Township and Range Coordinates

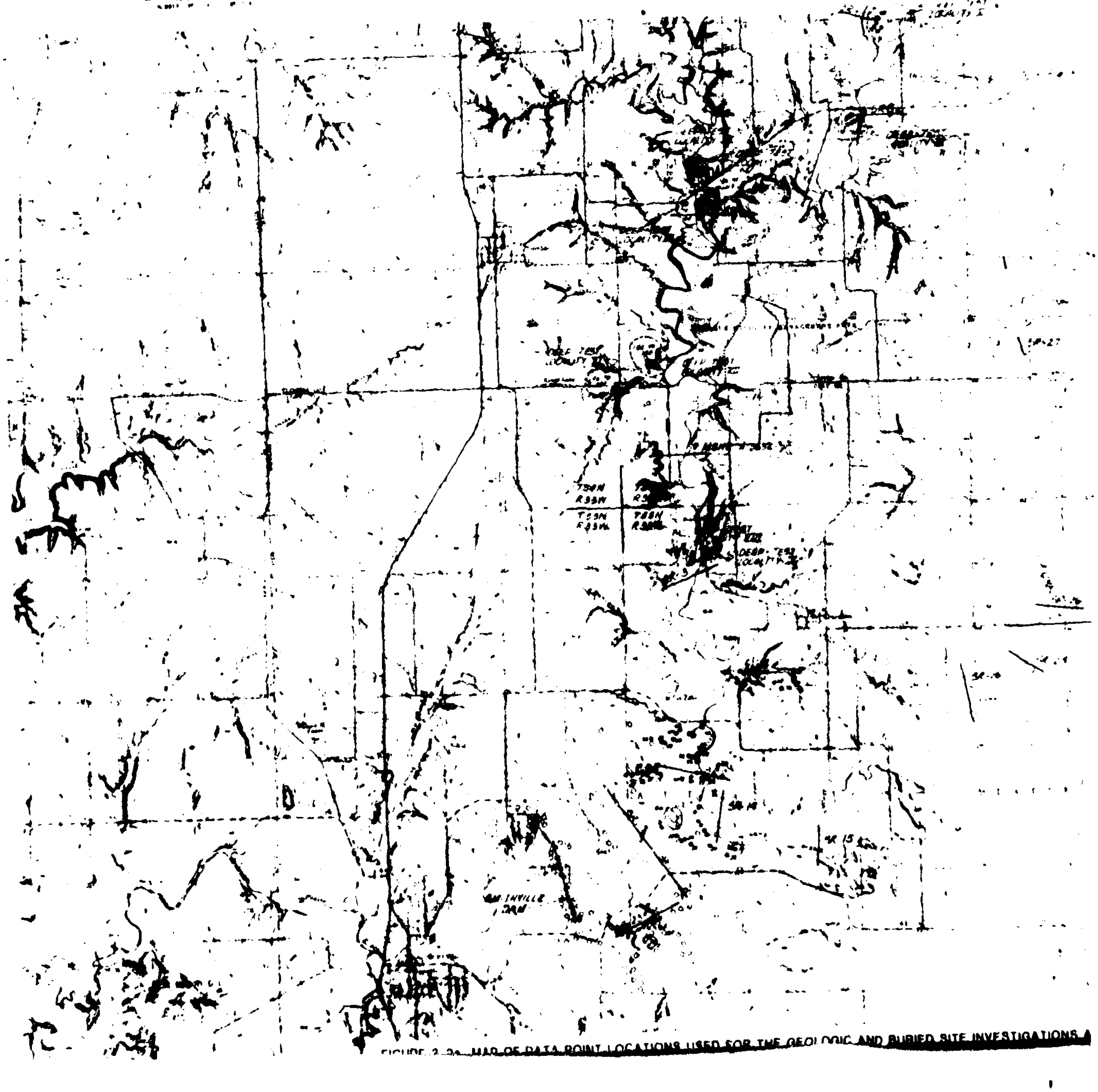
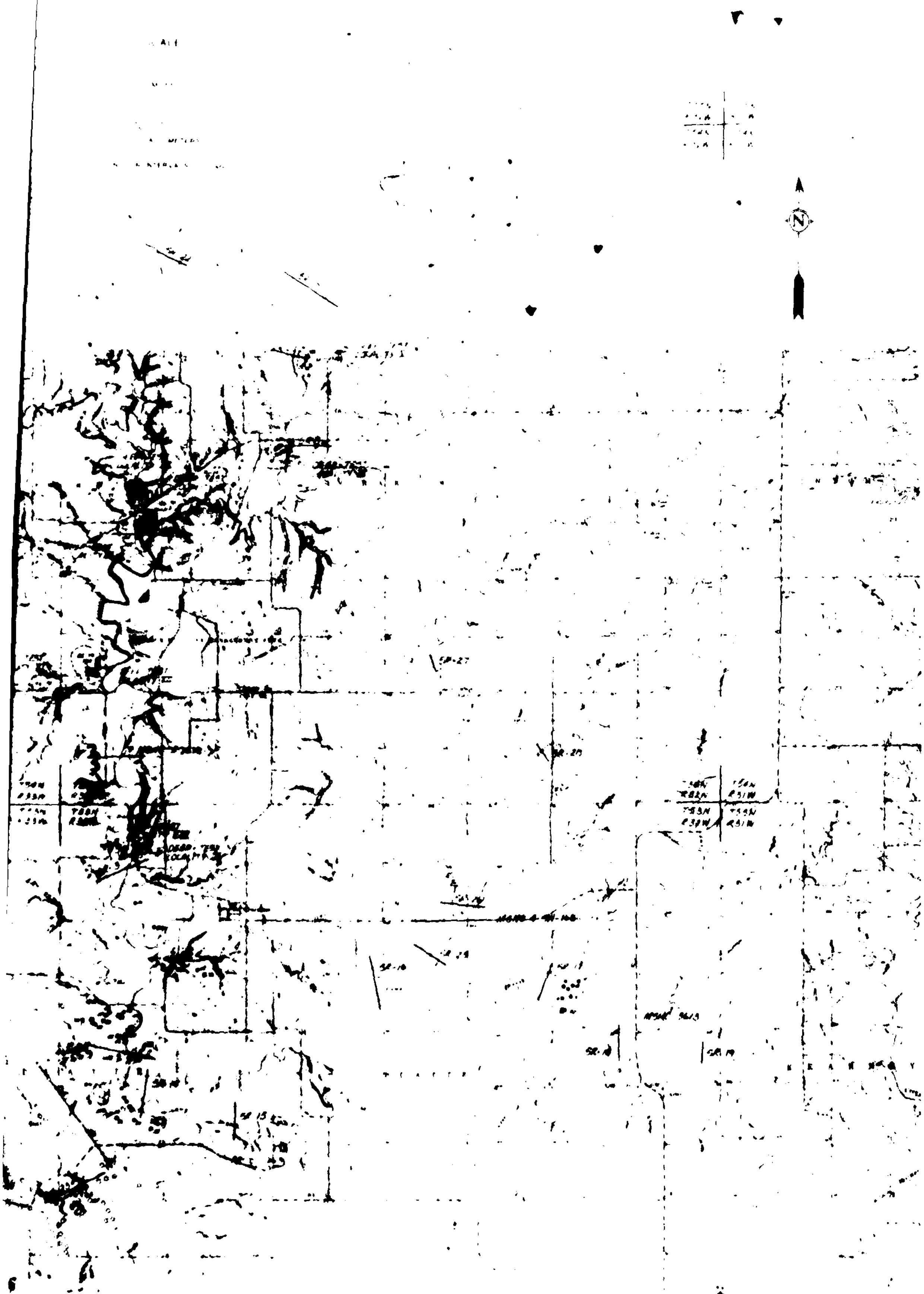
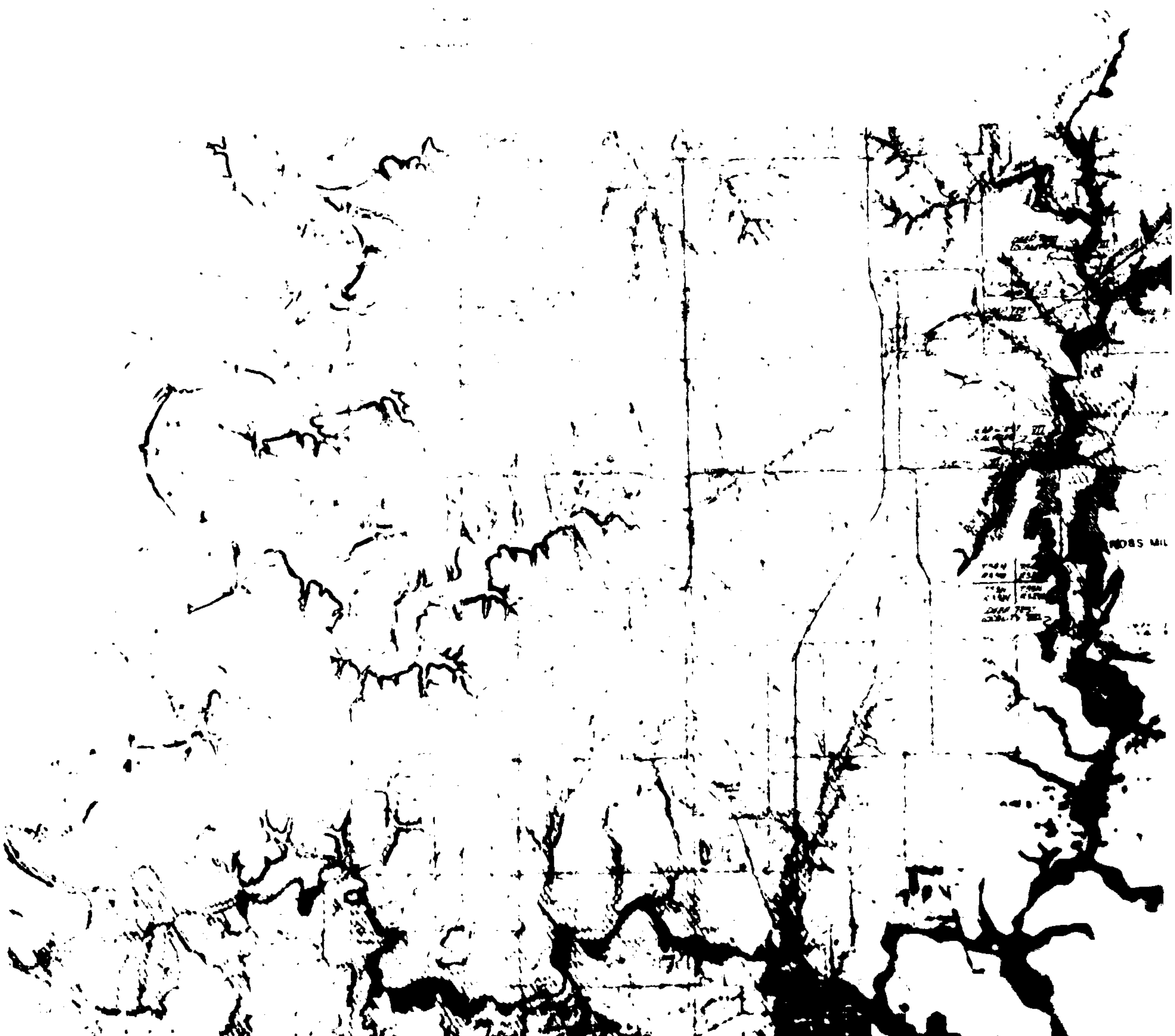


FIGURE 3-2a MAP OF DATA POINT LOCATIONS USED FOR THE GEOLOGIC AND BURIED SITE INVESTIGATIONS A



...OINT LOCATIONS USED FOR THE GEOLOGIC AND BURIED SITE INVESTIGATIONS AT SMITHVILLE LAKE



AD A147 498 BEFORE SMITH'S MILL: ARCHAEOLOGICAL AND GEOLOGICAL INVESTIGATIONS SMITHVI..(U) GAI CONSULTANTS INC MONROEVILLE PA W P MCHUGH ET AL. JUN 82

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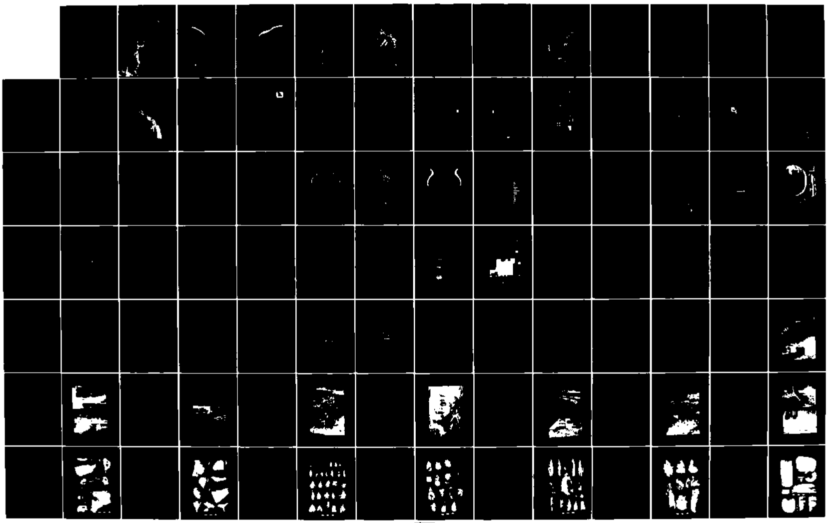

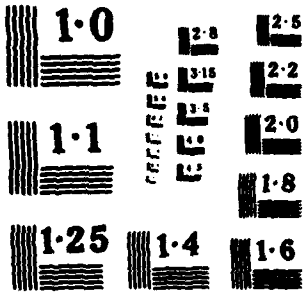
1·0
2·8
2·5
3·2
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3·6
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4·0
1·1
1·8
1·25
1·4
1·6

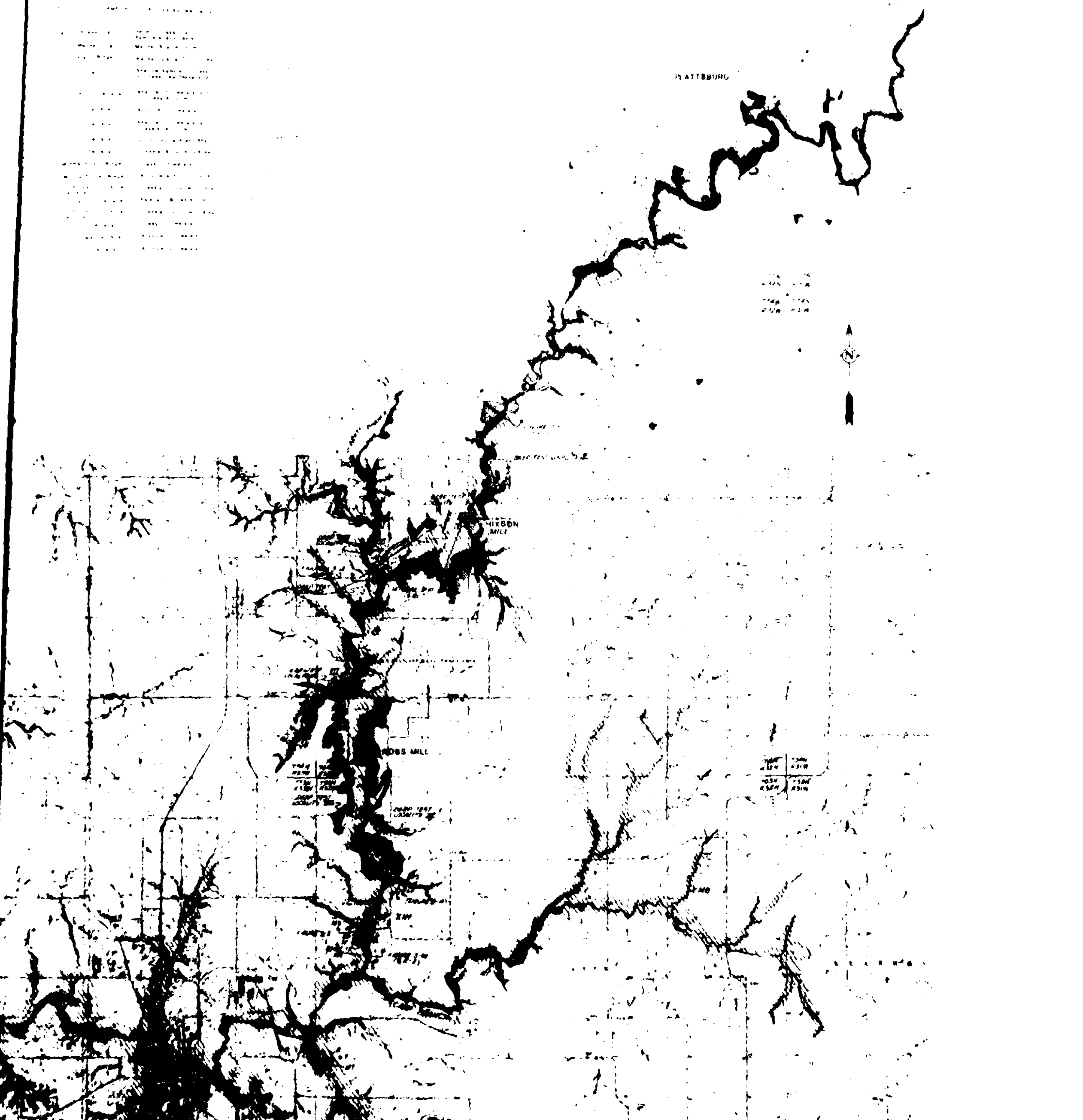


FIGURE 3-29 - MAP OF RIVERINE LANDFORMS, CROSS SECTIONS, AND SAMPLING LOCALITIES

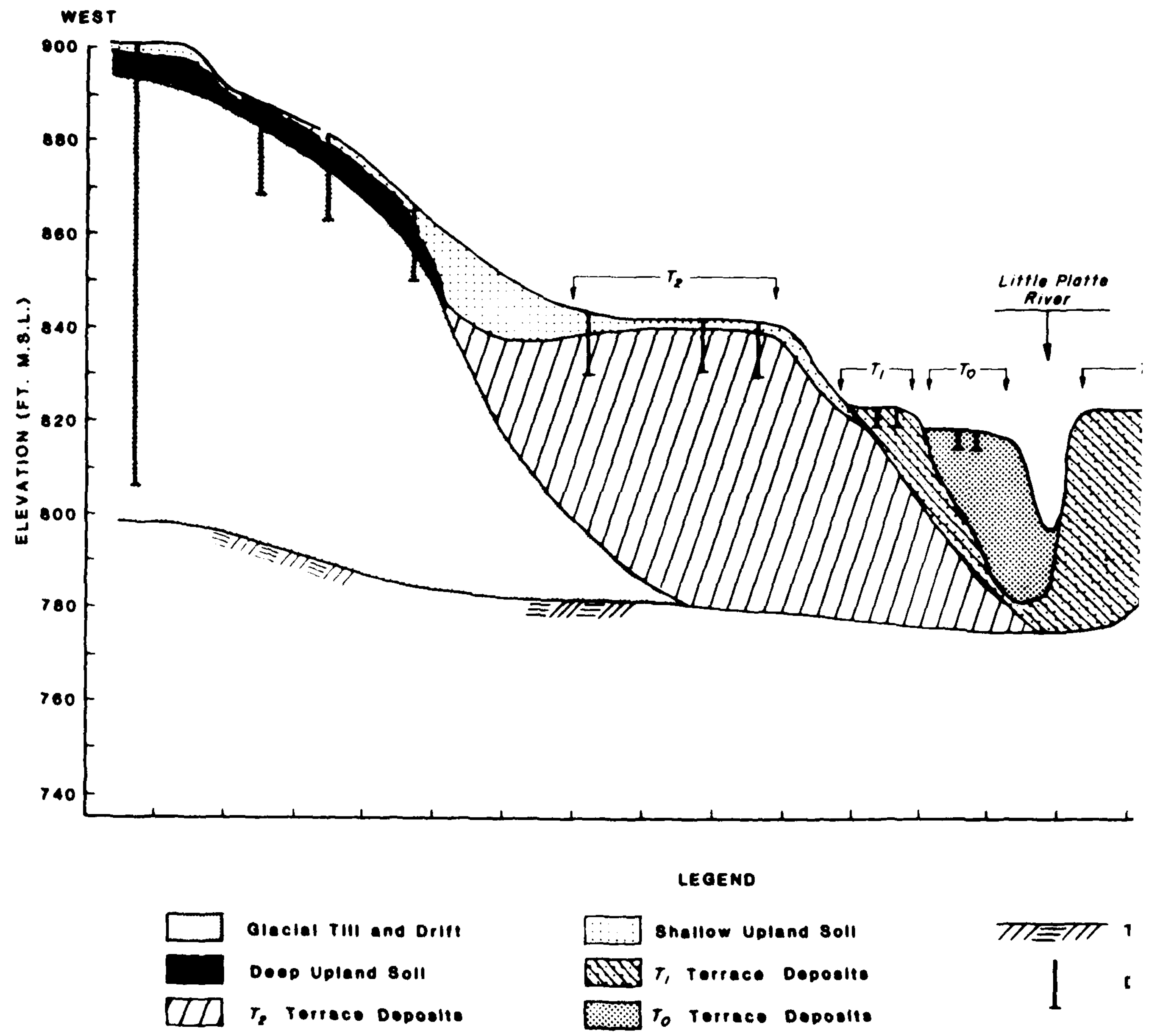
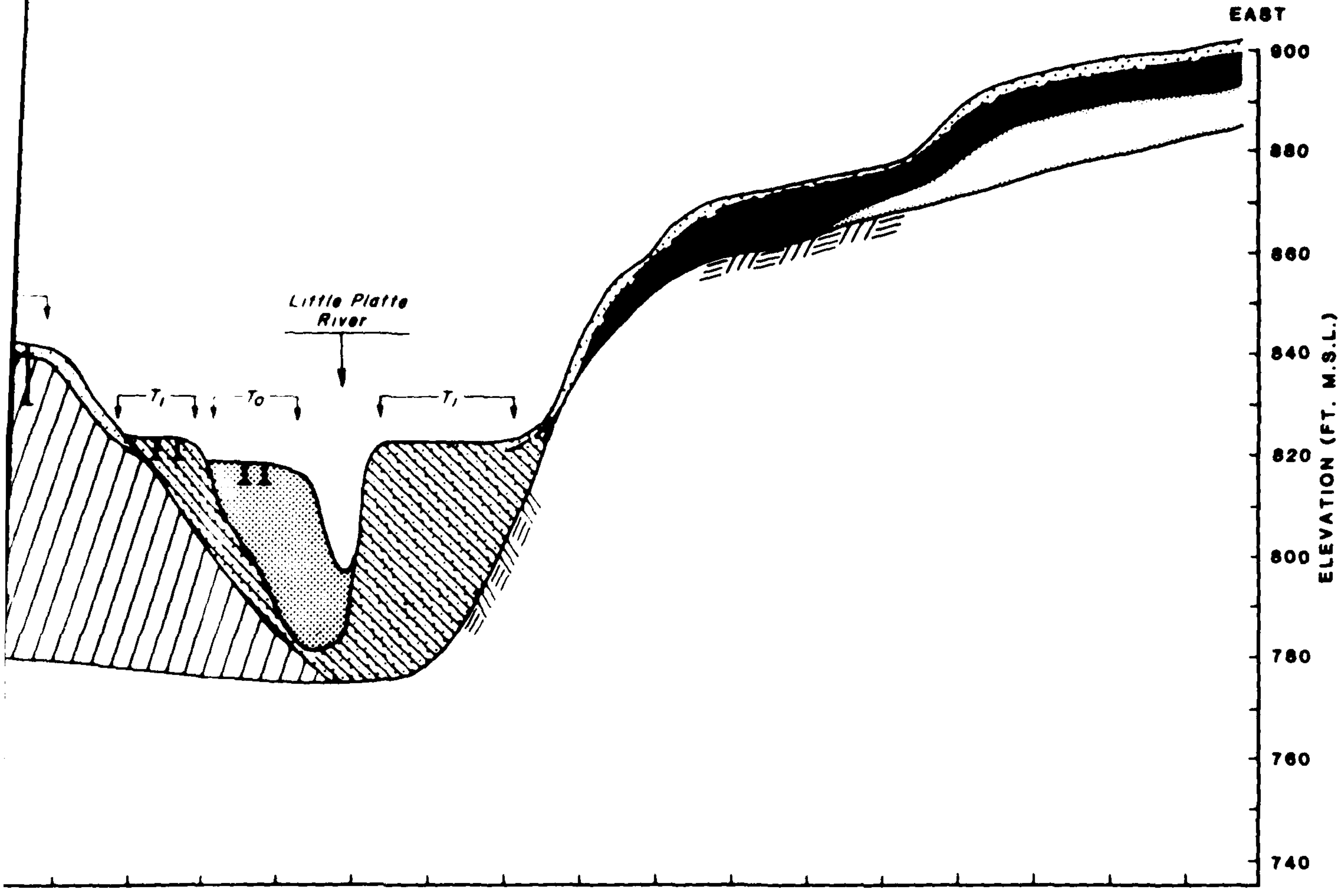


FIGURE 3-3 GENERALIZED GEOLOGIC CROSS-SECTION ACROSS TH
(see Figures 3-2a and 3-2b



ID

Upland Soil

ice Deposits

ice Deposits

Top of Bedrock

Data Point (Test Pit or Boring)

CROSS-SECTION ACROSS THE LITTLE PLATTE RIVER VALLEY, MISSOURI
(see Figures 3-2a and 3-2b for location)

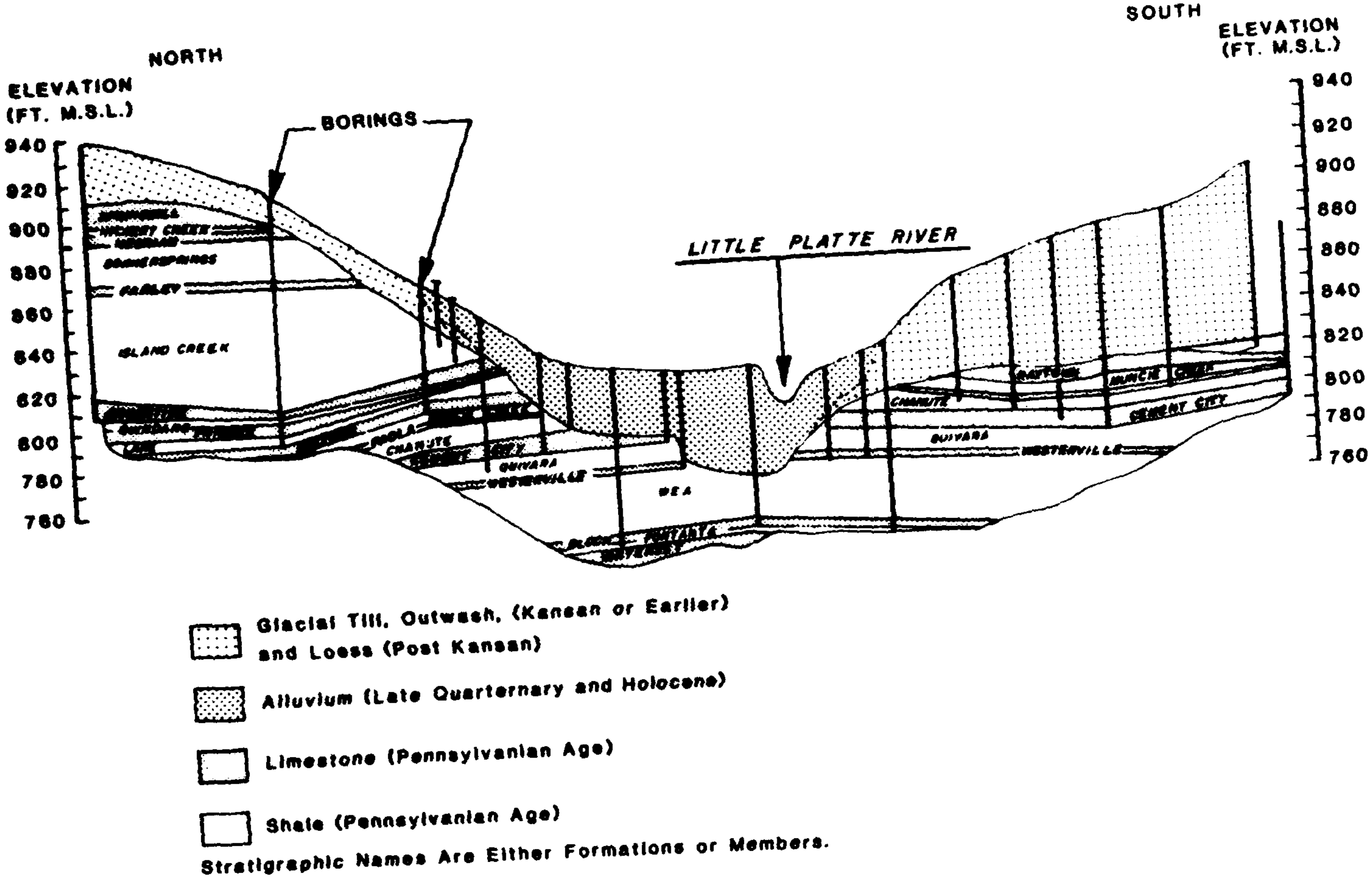


FIGURE 3-4 GENERALIZED GEOLOGIC CROSS-SECTION AT SMITHVILLE DAM
(see Figures 3-2b and 3-5 for location)

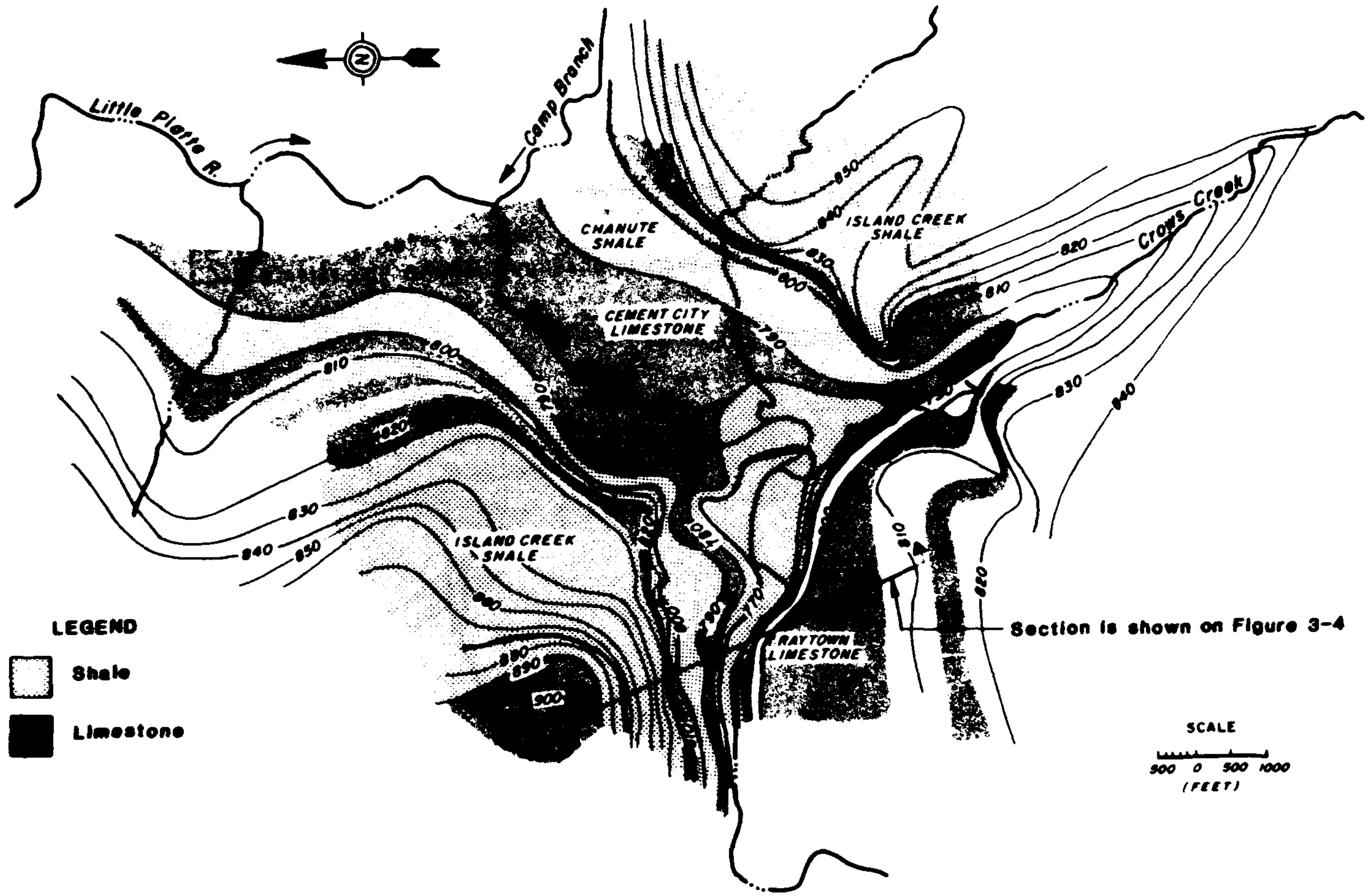


FIGURE 3-5 BEDROCK GEOLOGIC AND CONTOUR MAP OF SMITHVILLE DAM AND VICINITY

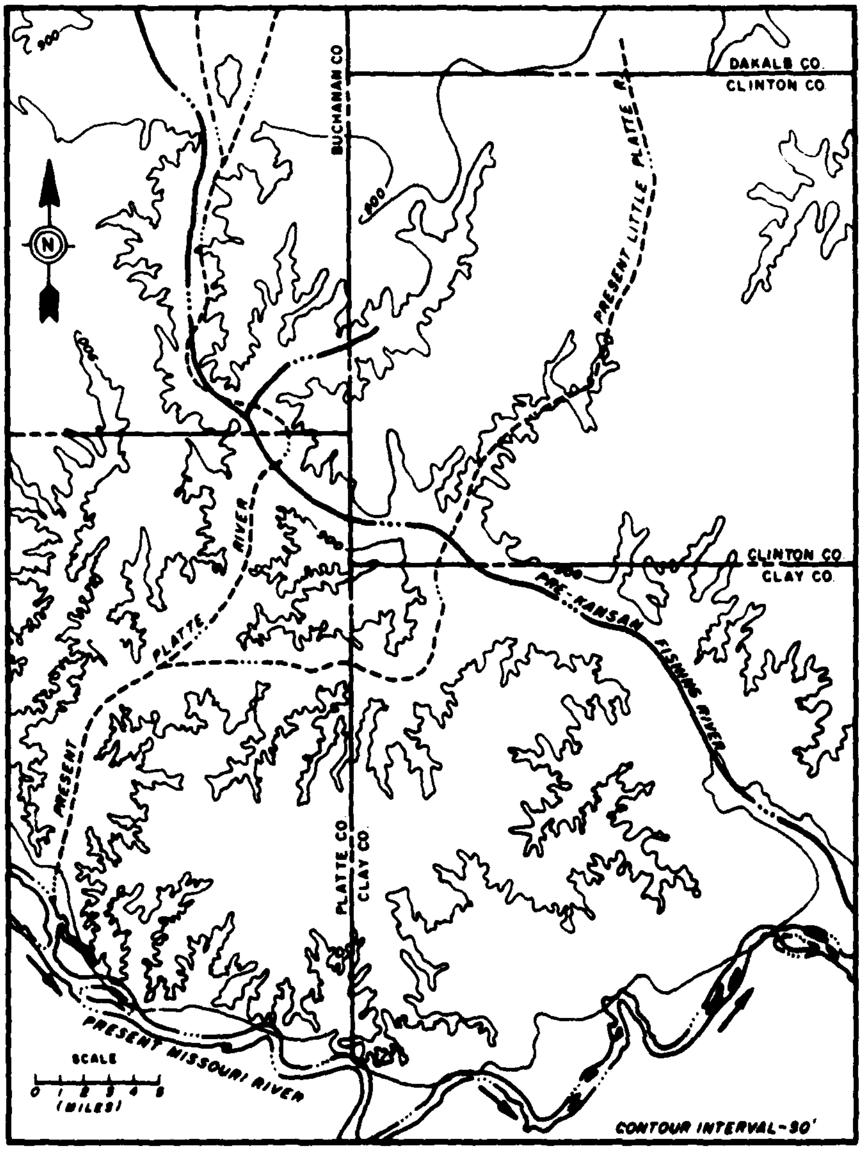


FIGURE 3-6 PREGLACIAL AND PRESENT DRAINAGES FOR THE LITTLE PLATTE RIVER AND VICINITY (900 foot M.S.L. top of bedrock contour depicts general outline of preglacial Fishing River valley)

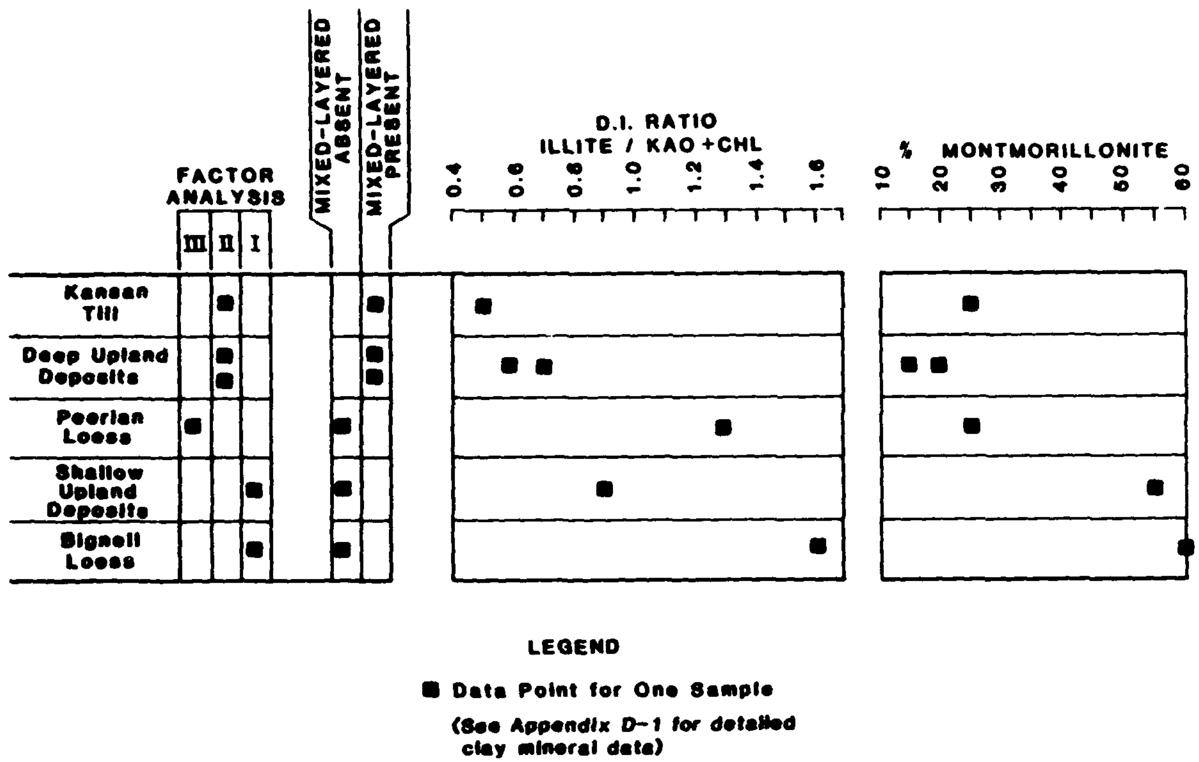


FIGURE 3-7 COMPARATIVE CLAY MINERALOGIES - UPLAND SOIL DEPOSITS OF THE LITTLE PLATTE VALLEY AND LOESS DEPOSITS OF NORTHWESTERN MISSOURI

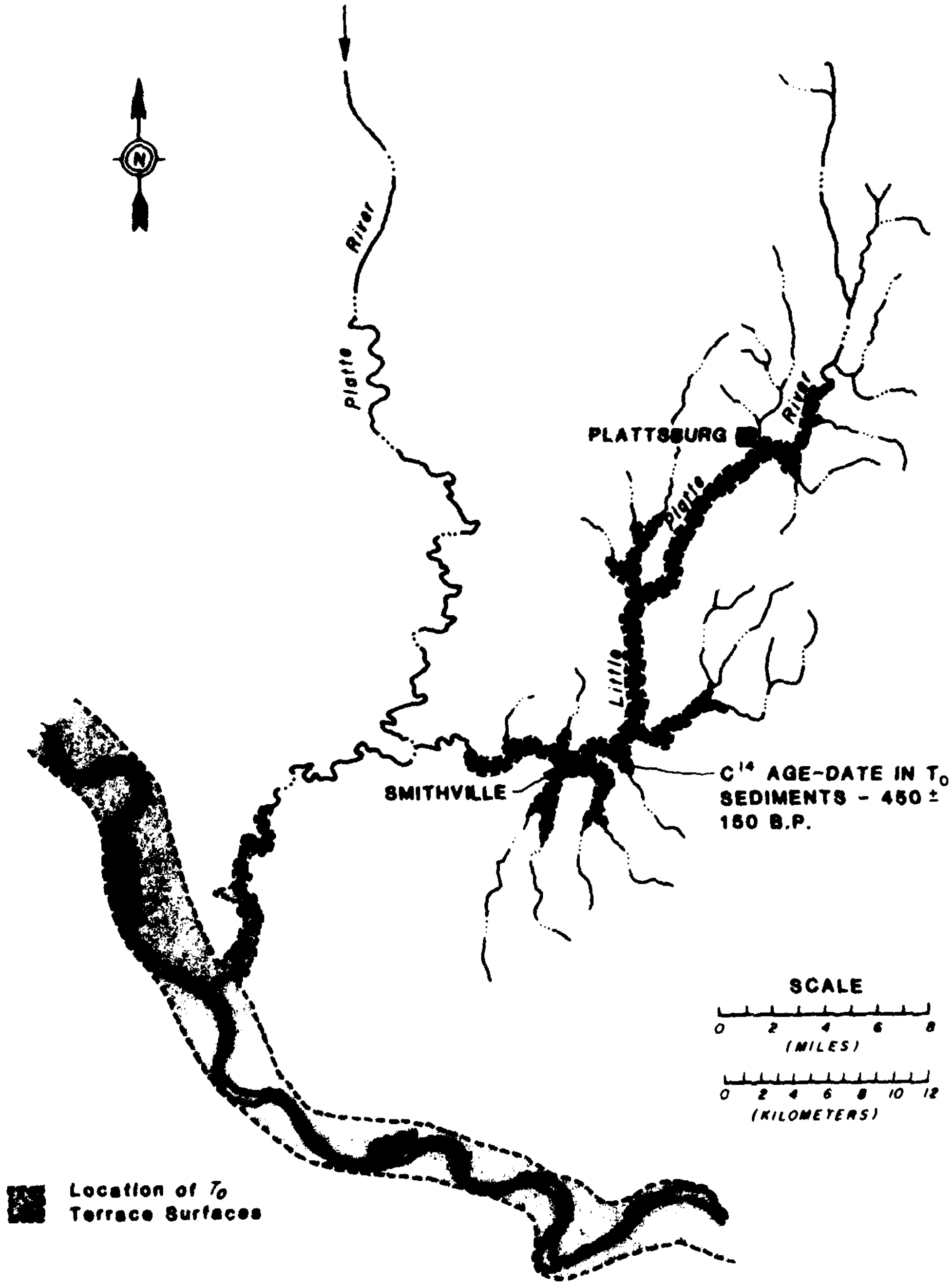


FIGURE 3-8 LIMITS OF T_0 TERRACE (FLOODPLAIN) SURFACES ALONG THE MISSOURI, PLATTE (MO) AND LITTLE PLATTE RIVERS

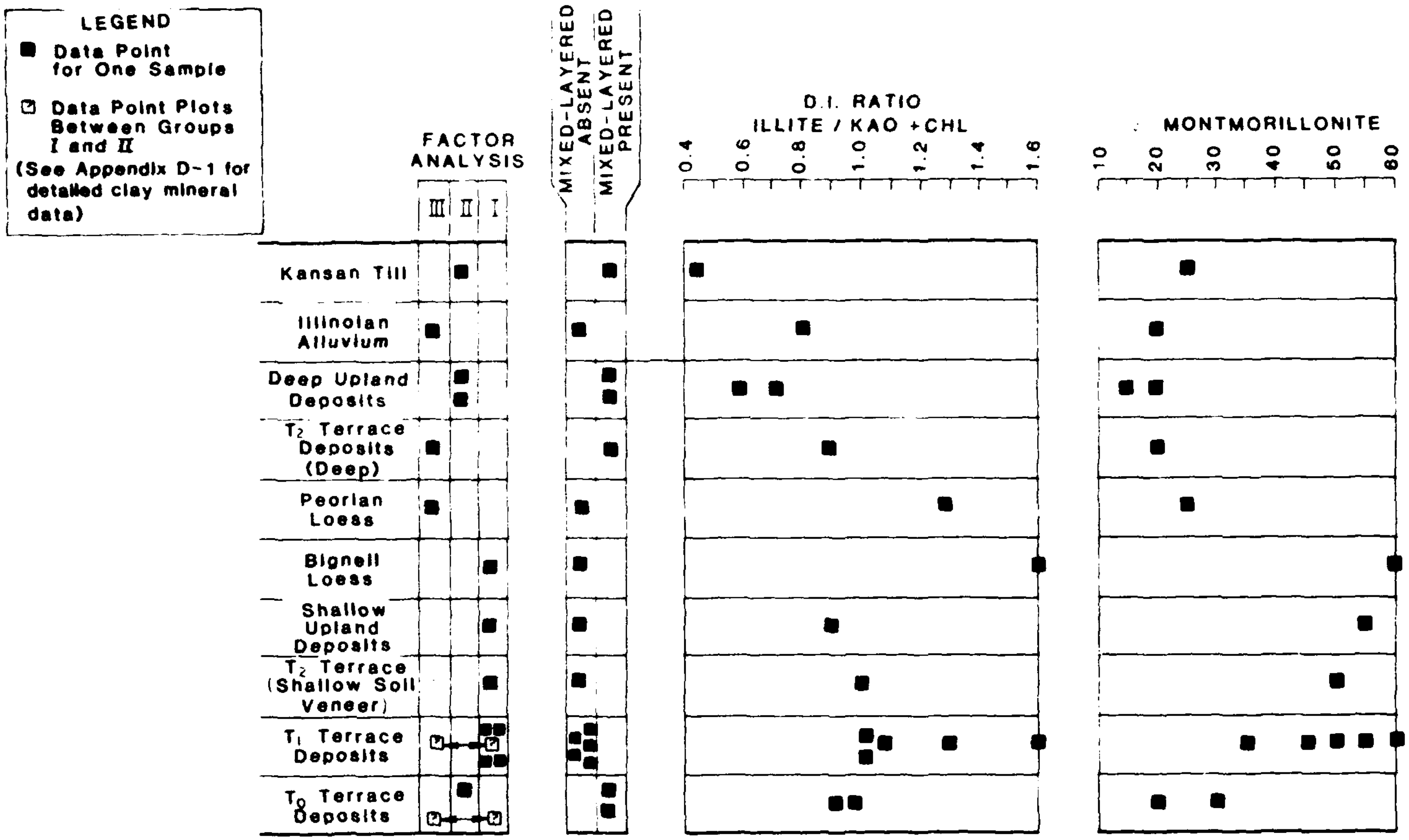


FIGURE 3-9 COMPARATIVE CLAY MINERALOGIES - SOIL DEPOSITS OF THE LITTLE PLATTE VALLEY AND OTHER DEPOSITS OF NORTHWESTERN MISSOURI

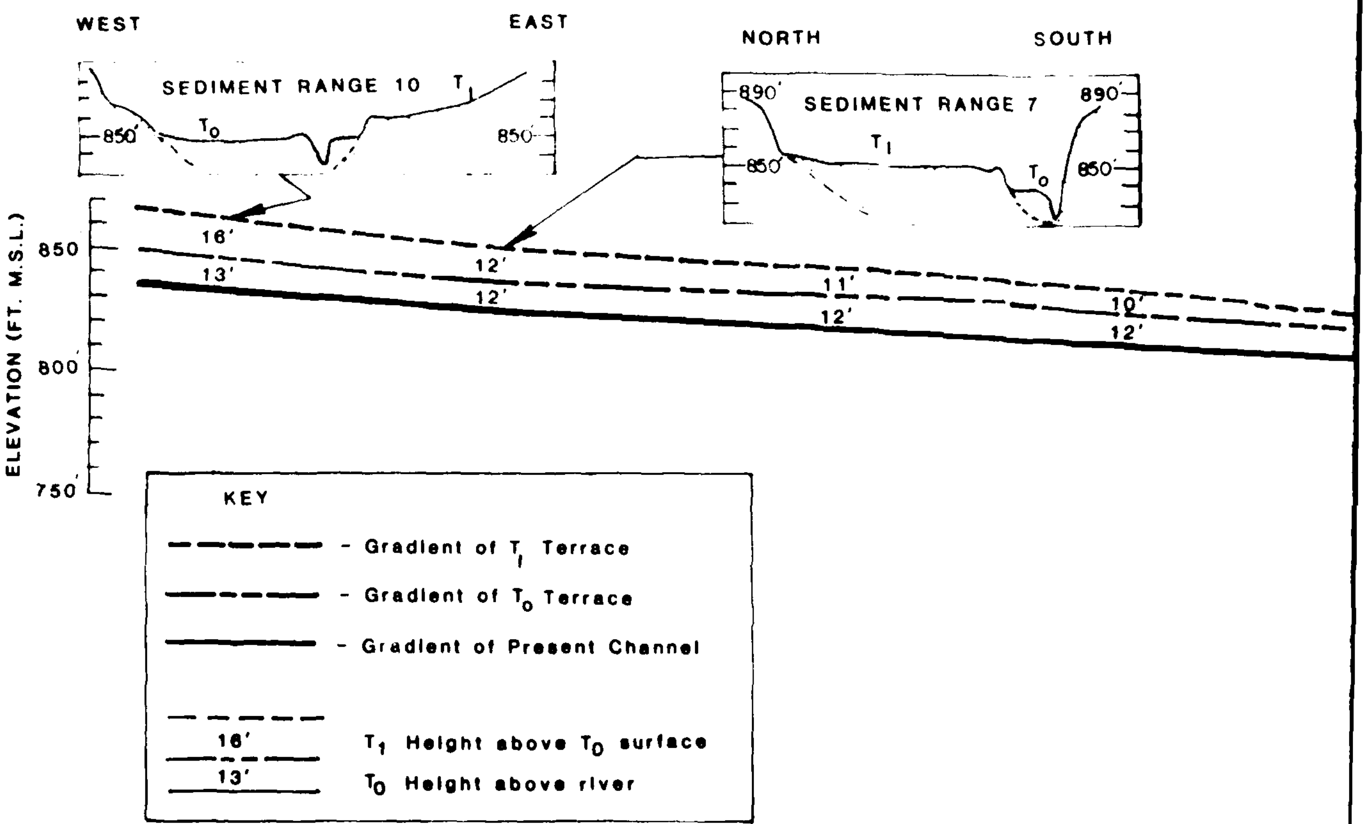
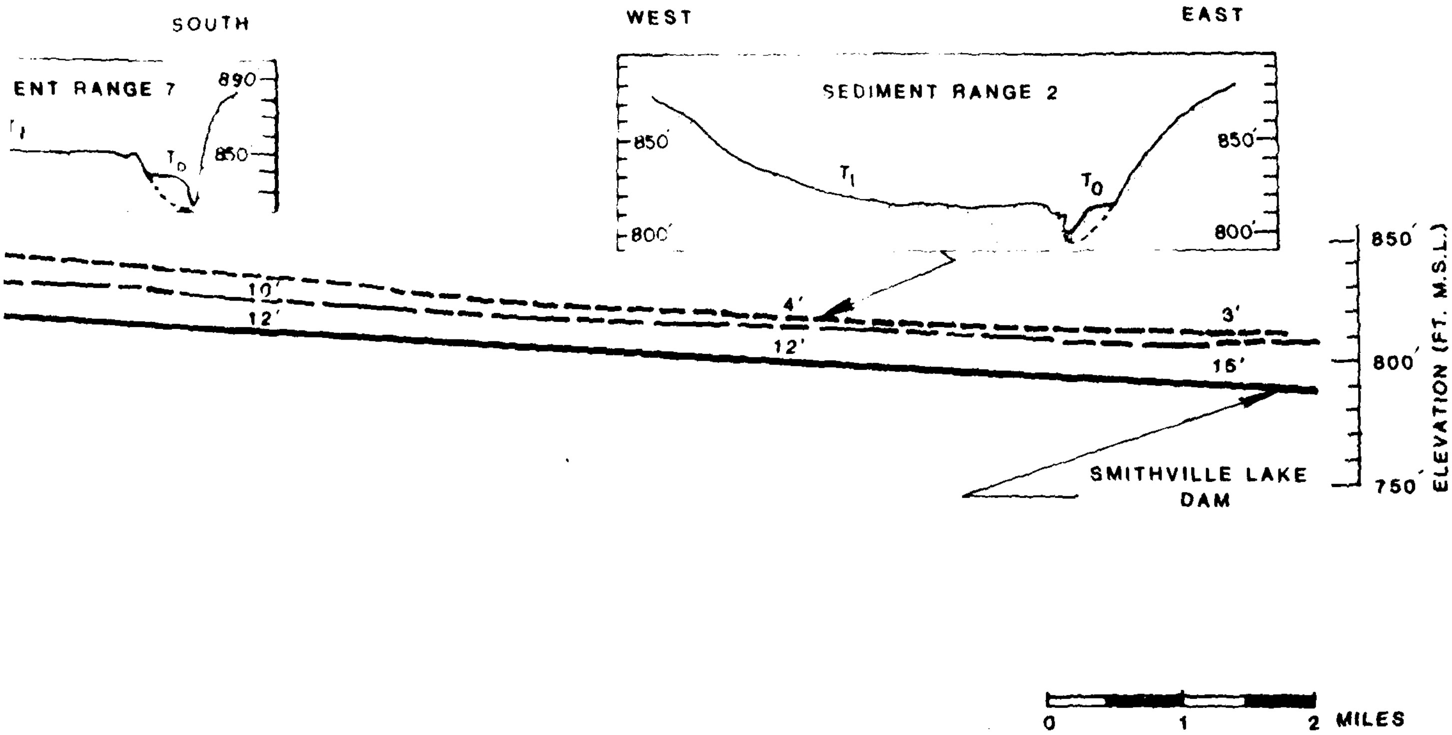


FIGURE 3-10 LONGITUDINAL AND CROSS-SECTIONAL PROFILES OF THE LITT
IN VALLEY GRADIENTS OF THE T_1 AND T_0 TERRACE SURFACES (see Figure 3



CTIONAL PROFILES OF THE LITTLE PLATTE VALLEY EMPHASIZING DIFFERENCES
RRACE SURFACES (see Figure 3-2b for cross-section locations)

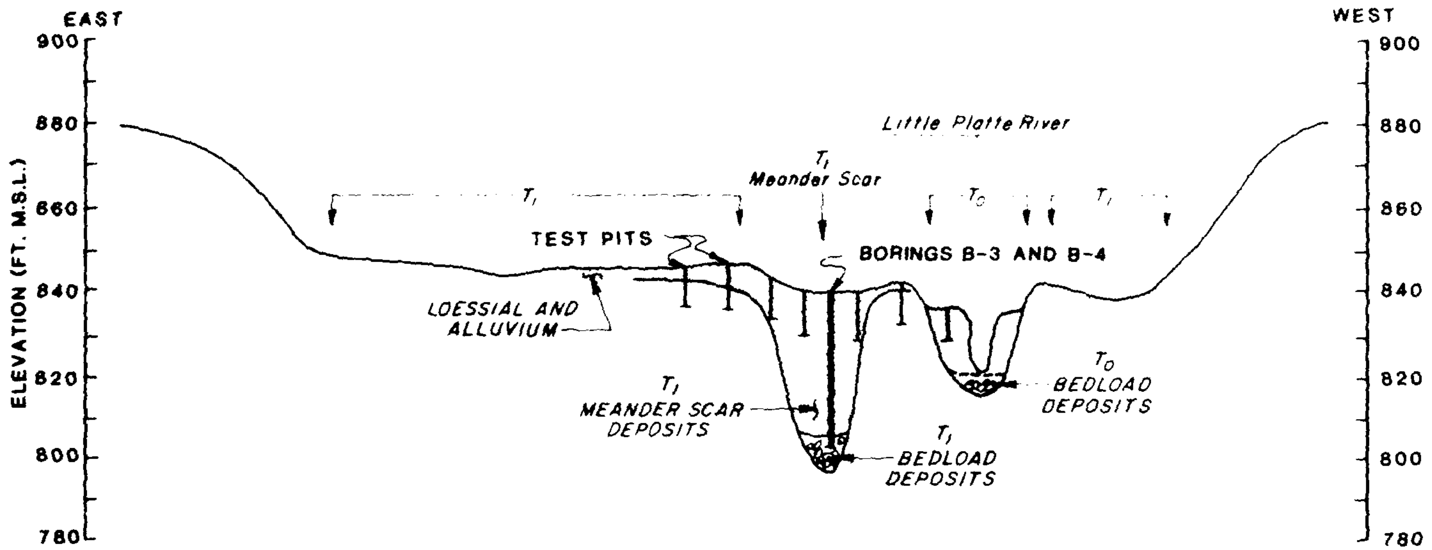
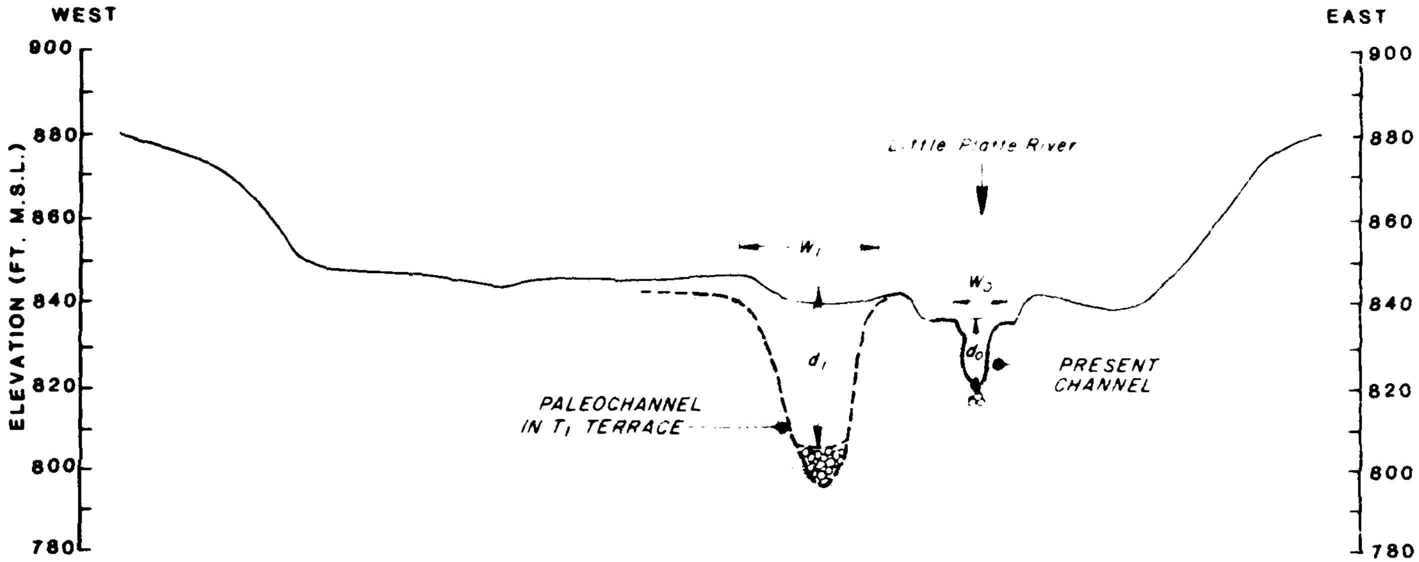


FIGURE 3-11 CROSS-SECTION OF LITTLE PLATTE VALLEY ALONG SEDIMENT RANGE 6 SHOWING PRESENT CHANNEL (T_0) AND PALEOCHANNEL (T_1) ALLUVIAL DEPOSITS (see Figures 3-2a and 3-2b for location of cross-section)



LEGEND

W_1 Width of Paleochannel
W_0 Width of Present Channel
d_1 Depth to Bedload in Paleochannel
d_0 Depth to Bedload in Present Channel

FIGURE 3-12 CROSS-SECTION OF PRESENT (T_0) AND PALEOCHANNEL (T_1) CHANNELS ALONG SEDIMENT RANGE 6 SHOWING WIDTH TO DEPTH RELATIONSHIPS (See Figures 3-2a and 3-2b for location)

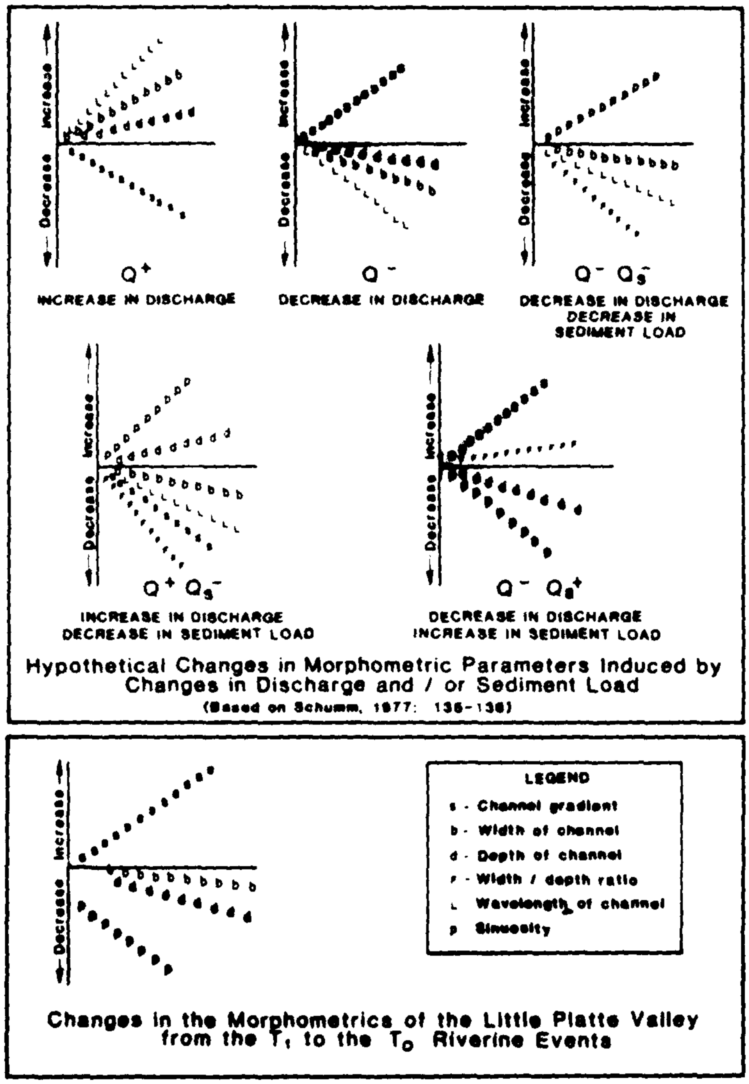


FIGURE 3-13 COMPARATIVE ANALYSIS OF THE MORPHOMETRIC CHANGES BETWEEN T_1 AND T_0 TERRACE FLUVIAL EVENTS IN THE LITTLE PLATTE VALLEY

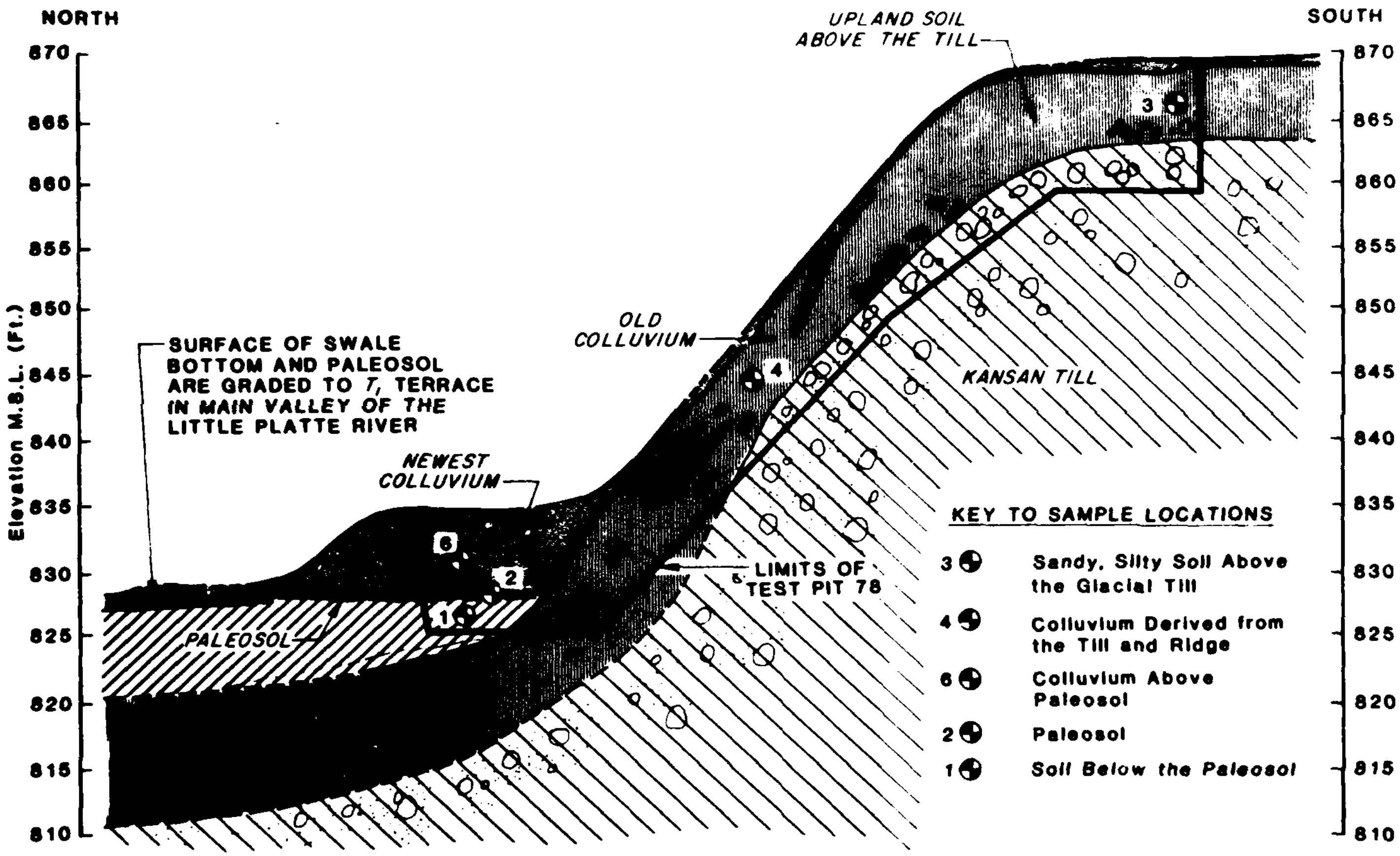


FIGURE 3-14 GENERALIZED GEOLOGIC CROSS-SECTION OF TEST PIT 78 AND HILLSLOPE ON A TRIBUTARY SWALE OF THE LITTLE PLATTE VALLEY (see Figure 3-2a and 3-2b for location, and Appendix D-VII, Table D-7 for other data)

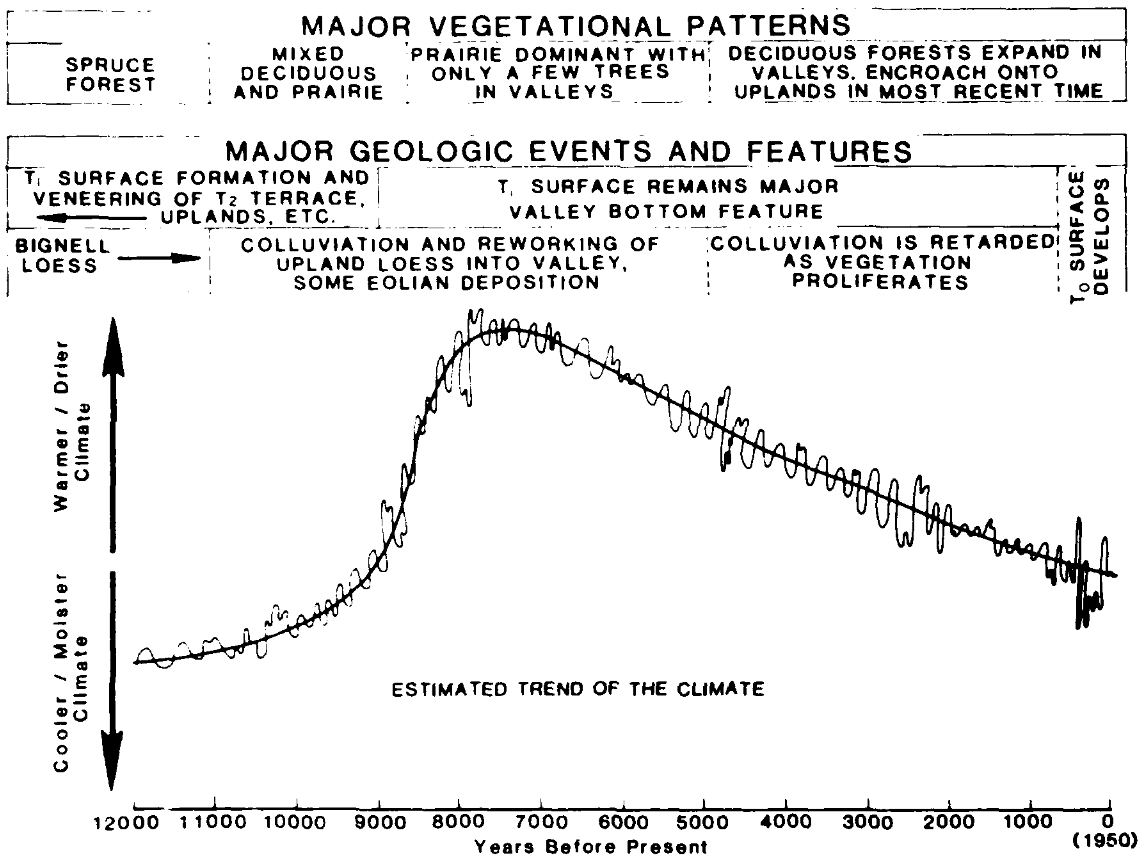


FIGURE 3-15 CHRONOLOGY OF CLIMATIC, VEGETATIONAL AND GEOLOGIC EVENTS IN THE LITTLE PLATTE VALLEY

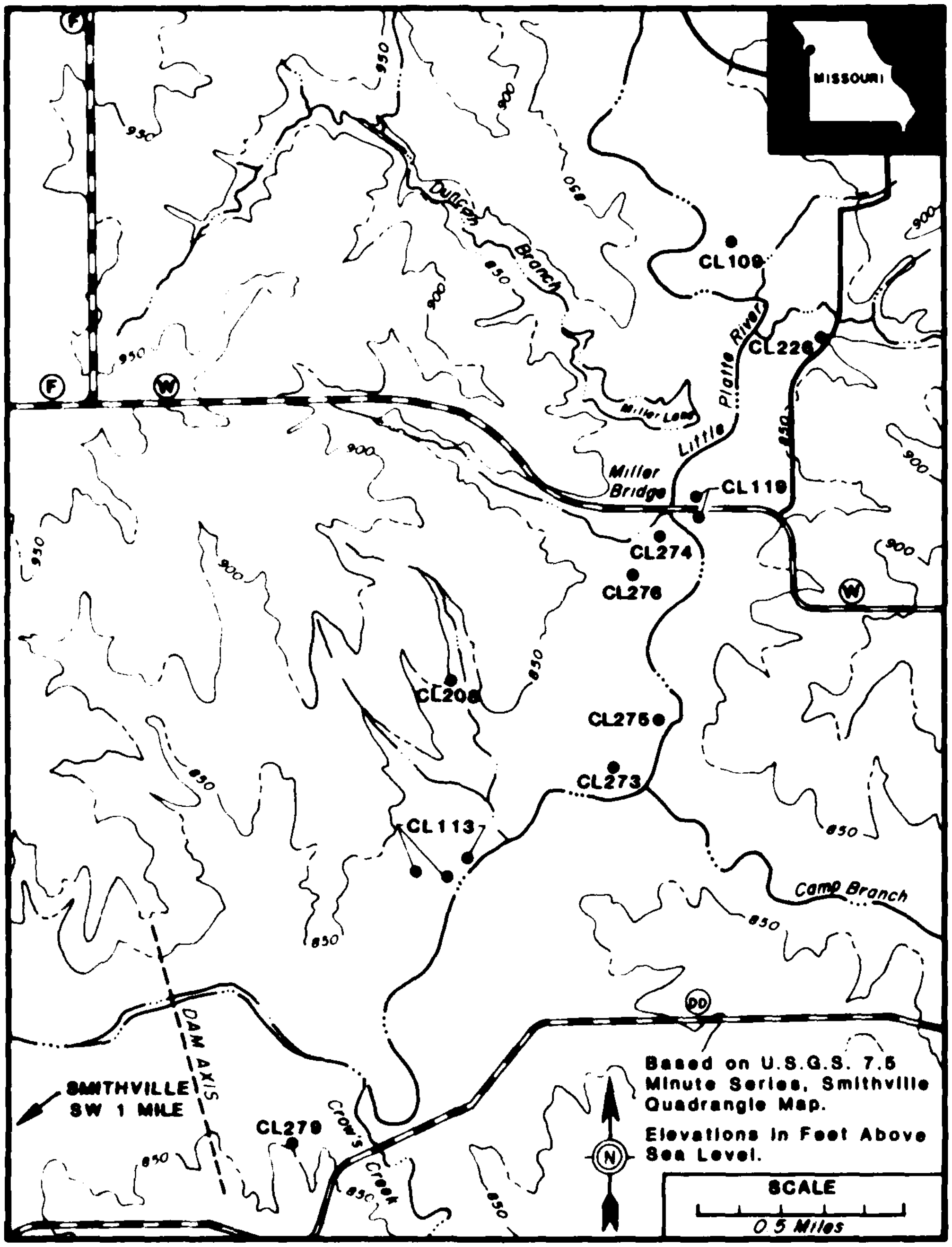


FIGURE 4-1 LOCATION OF ARCHAEOLOGICAL SITES IN THE LOWER PART OF THE SMITHVILLE LAKE RESERVOIR

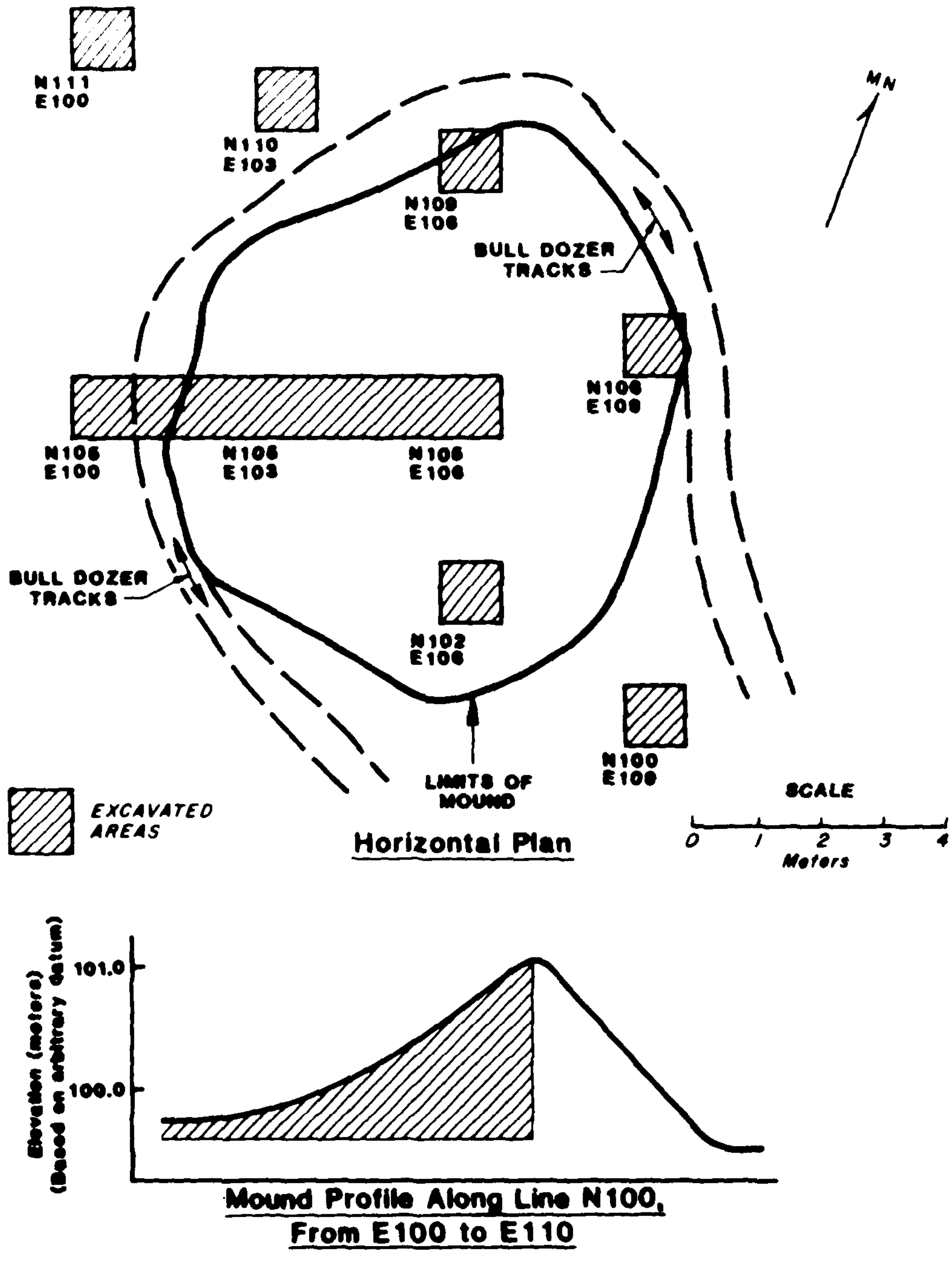


FIGURE 4-2 SITE 23CL208: PLAN VIEW SHOWING EXCAVATED AREAS AND THE MOUND PROFILE

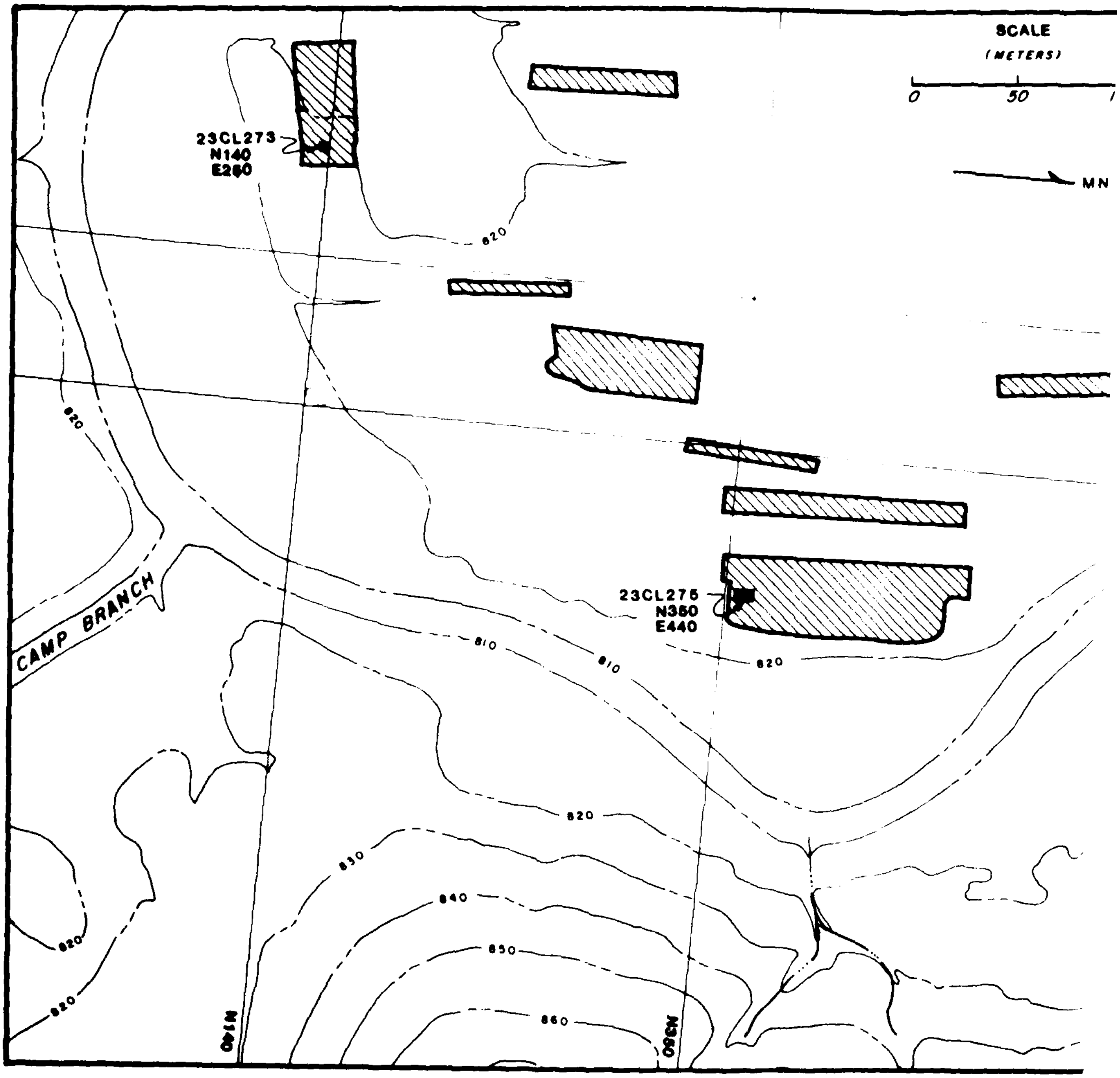
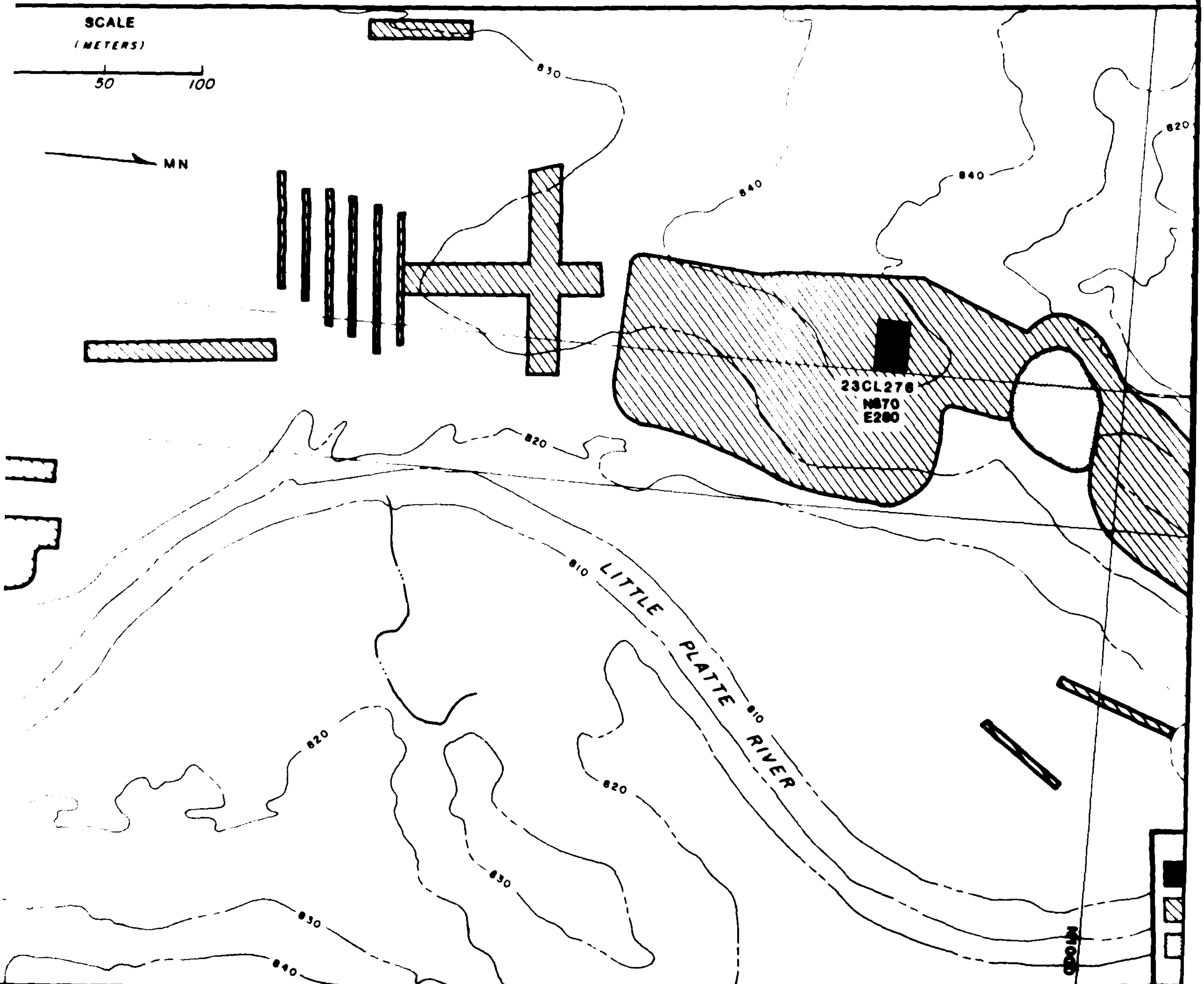
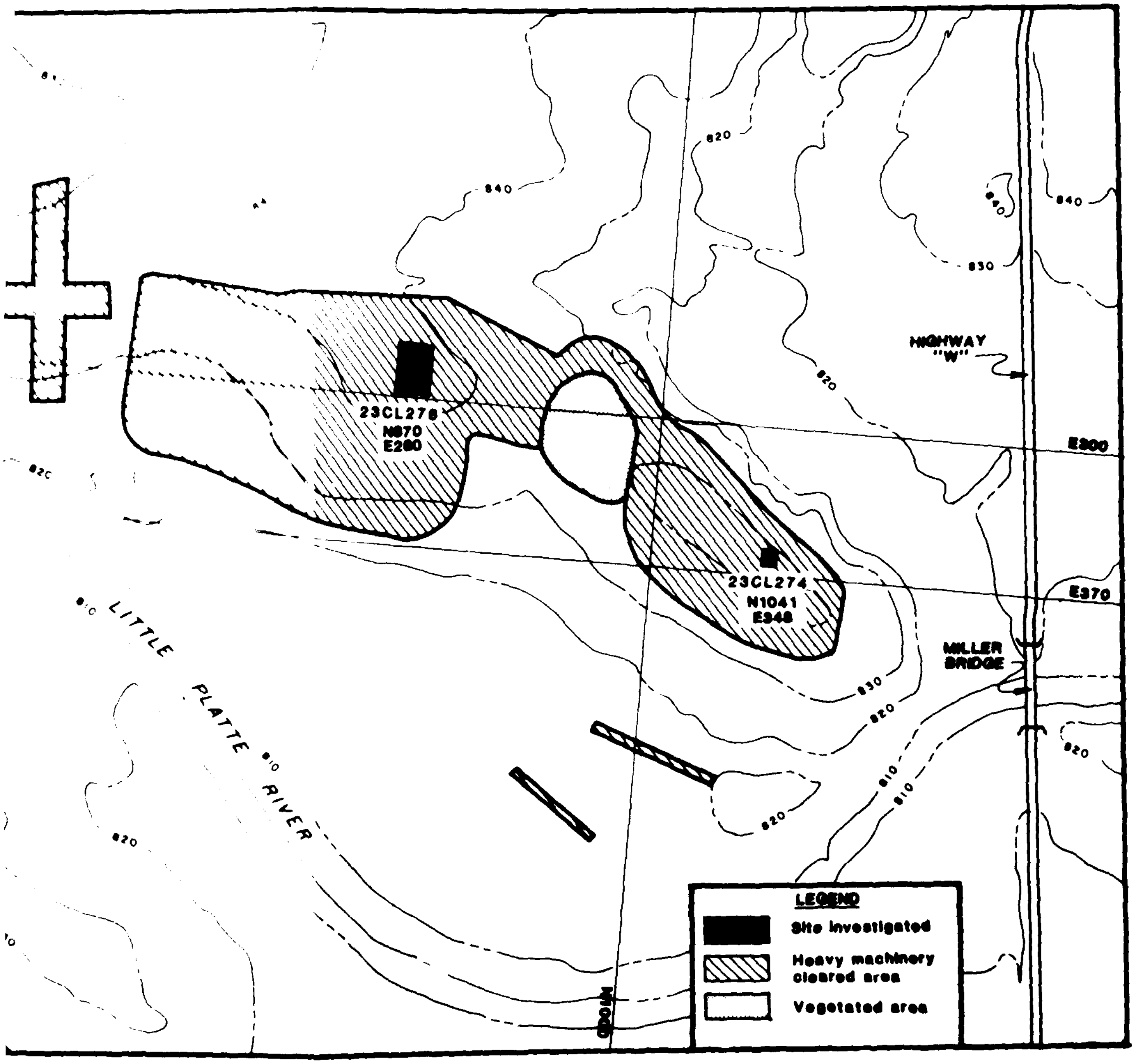


FIGURE 4-3 SITES 23CL273-276: LOCATION OF



OCATION OF THE FOUR SITES, MOTOR-SCRAPER CLEARED AREAS AND THE BASE GRID SYSTEM



RAPER CLEARED AREAS AND THE BASE GRID SYSTEM

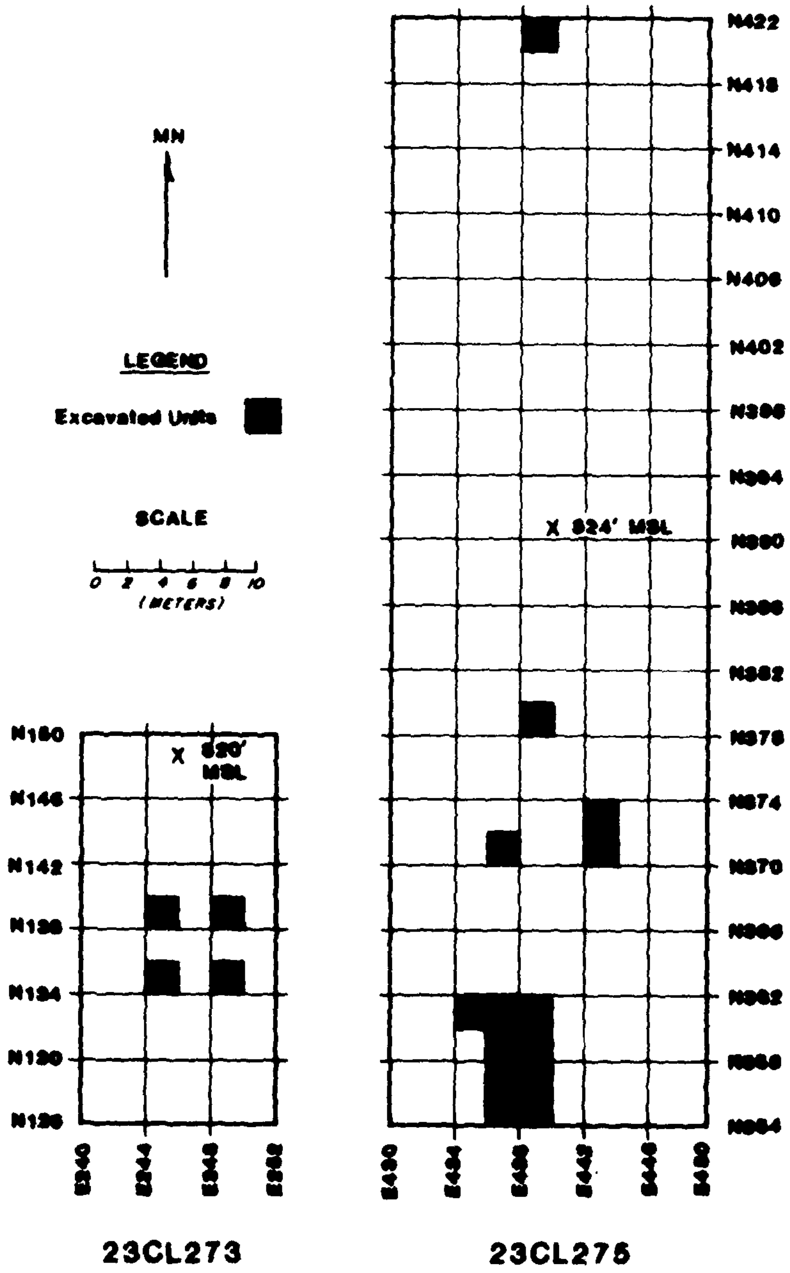


FIGURE 4-4 SITES 23CL273 AND 23CL275: MAPS SHOWING THE DISTRIBUTION OF EXCAVATED UNITS

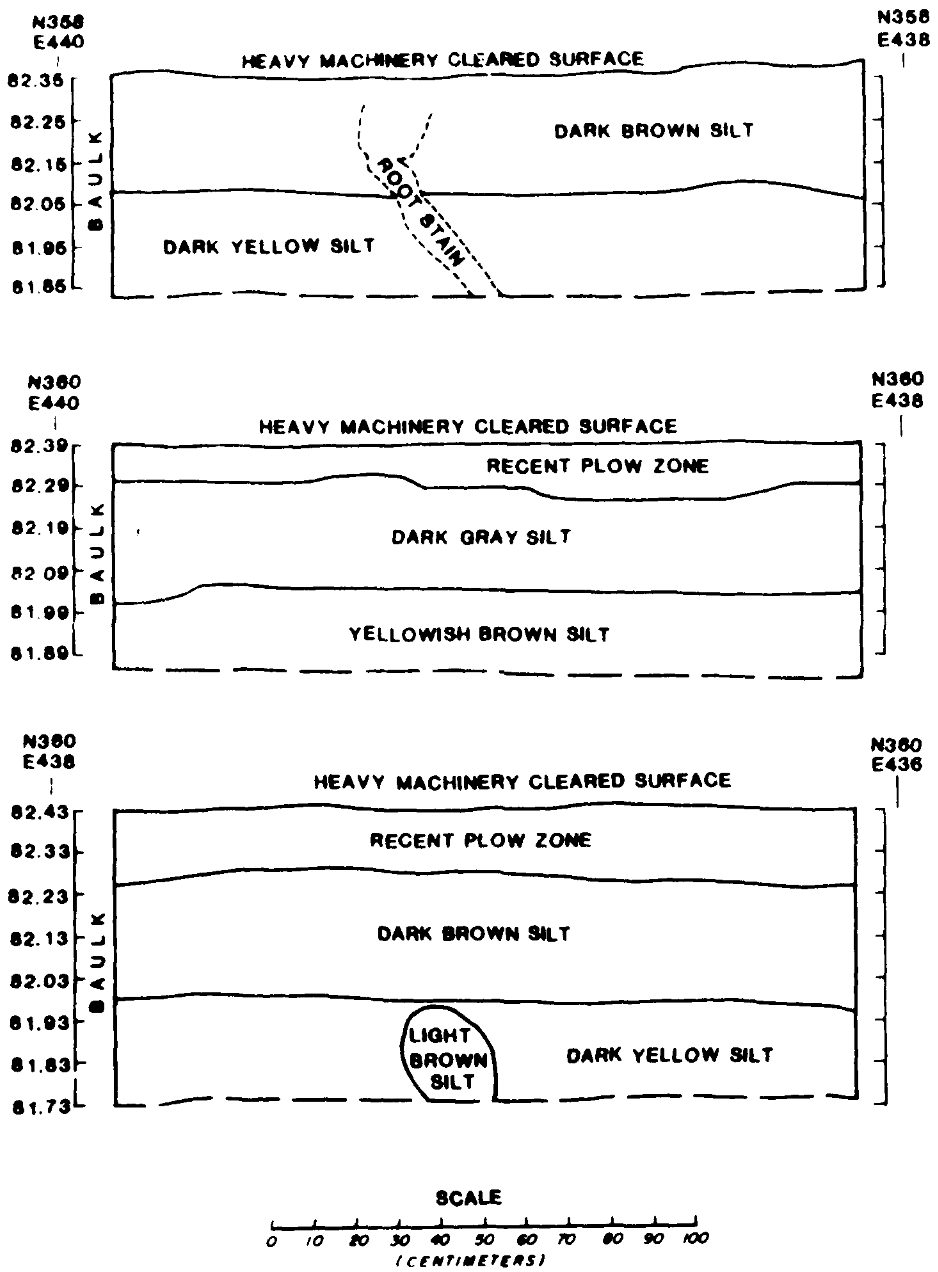


FIGURE 4-5 SITE 23CL275: PROFILES OF THREE WALLS SHOWING THE SIMPLE ALLUVIAL STRATIGRAPHY OF THIS FLOODPLAIN SITE

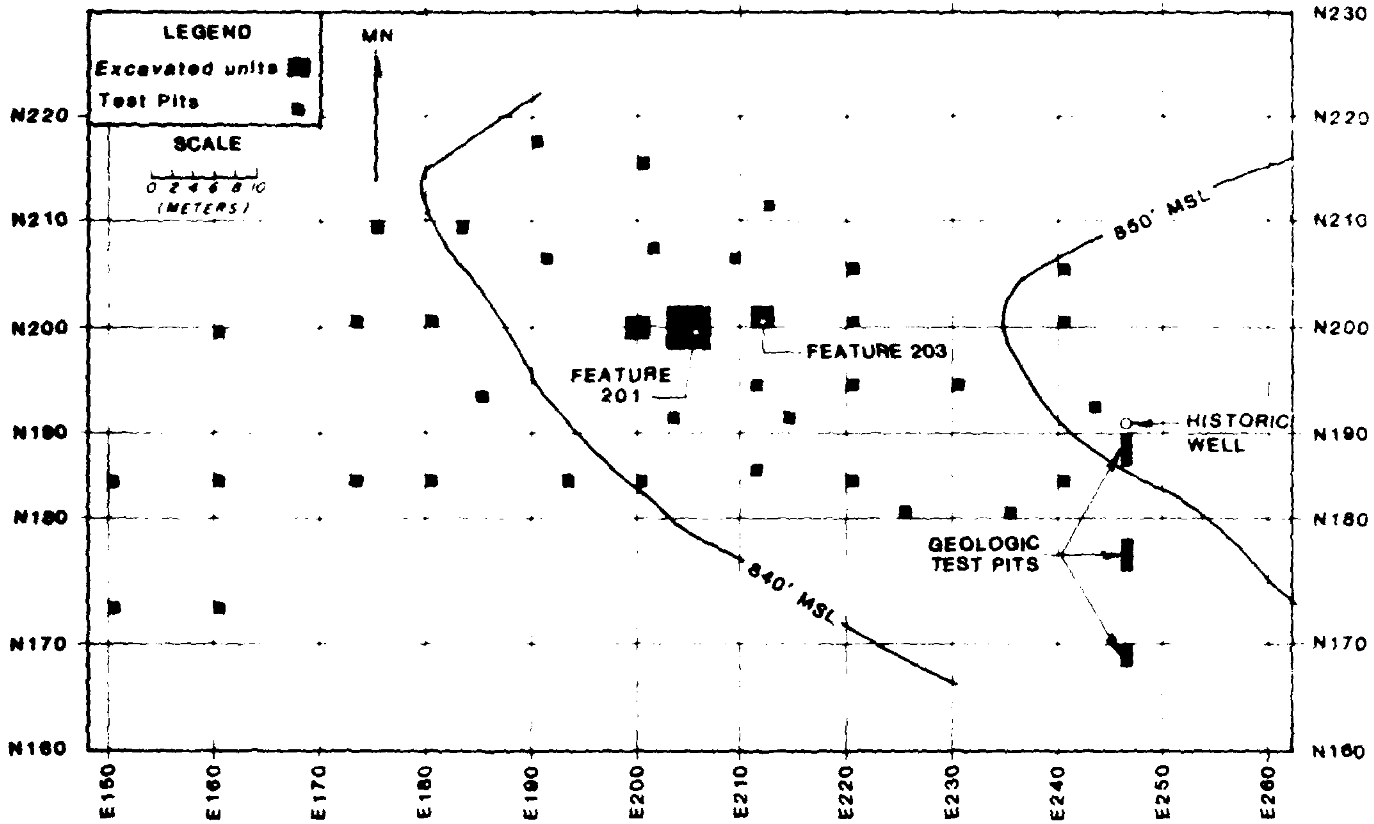


FIGURE 4-6 SITE 23CL226: LOCATIONS OF EXCAVATED UNITS, FEATURES AND GEOLOGIC TEST PITS

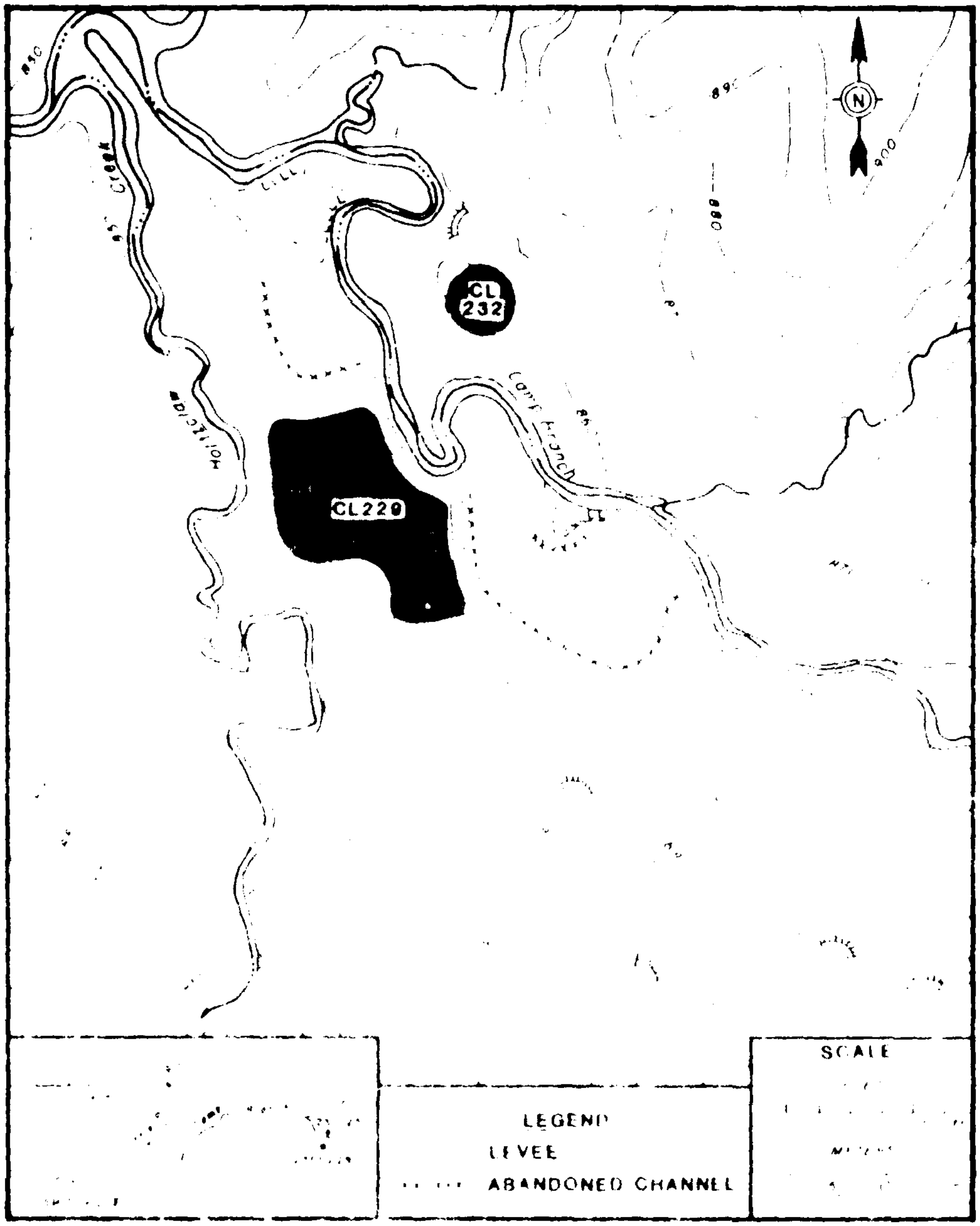


FIGURE 4-7 SITES 23CL229 AND 23CL232. MAP SHOWING THE TOPOGRAPHY AND DRAINAGE PATTERN OF THE LOCALE OF THE SITES

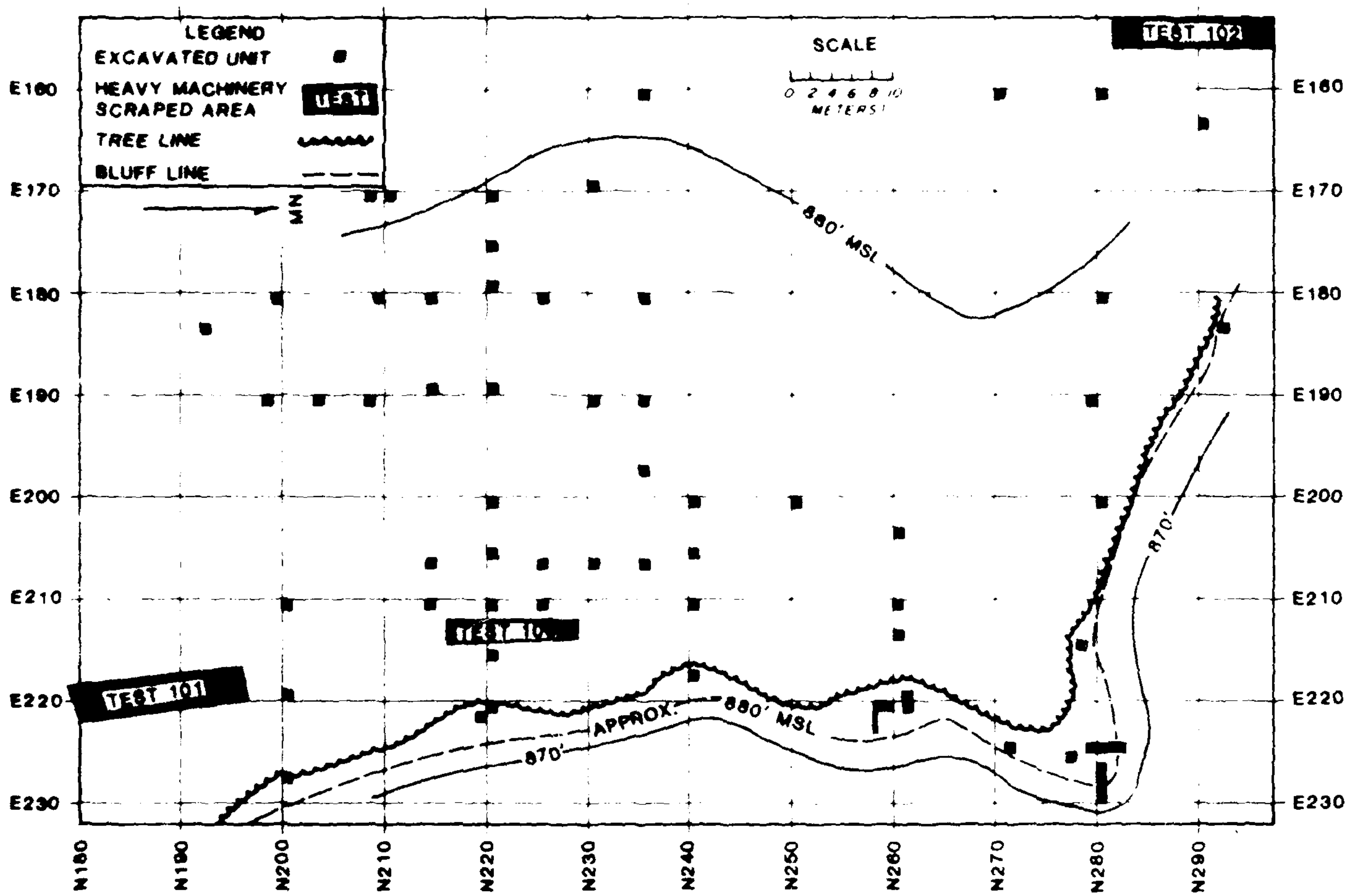


FIGURE 4-8 SITE 23CL229: LOCATION OF MOST EXCAVATION UNITS AND AREAS CLEARED BY TRACTOR-BLADE

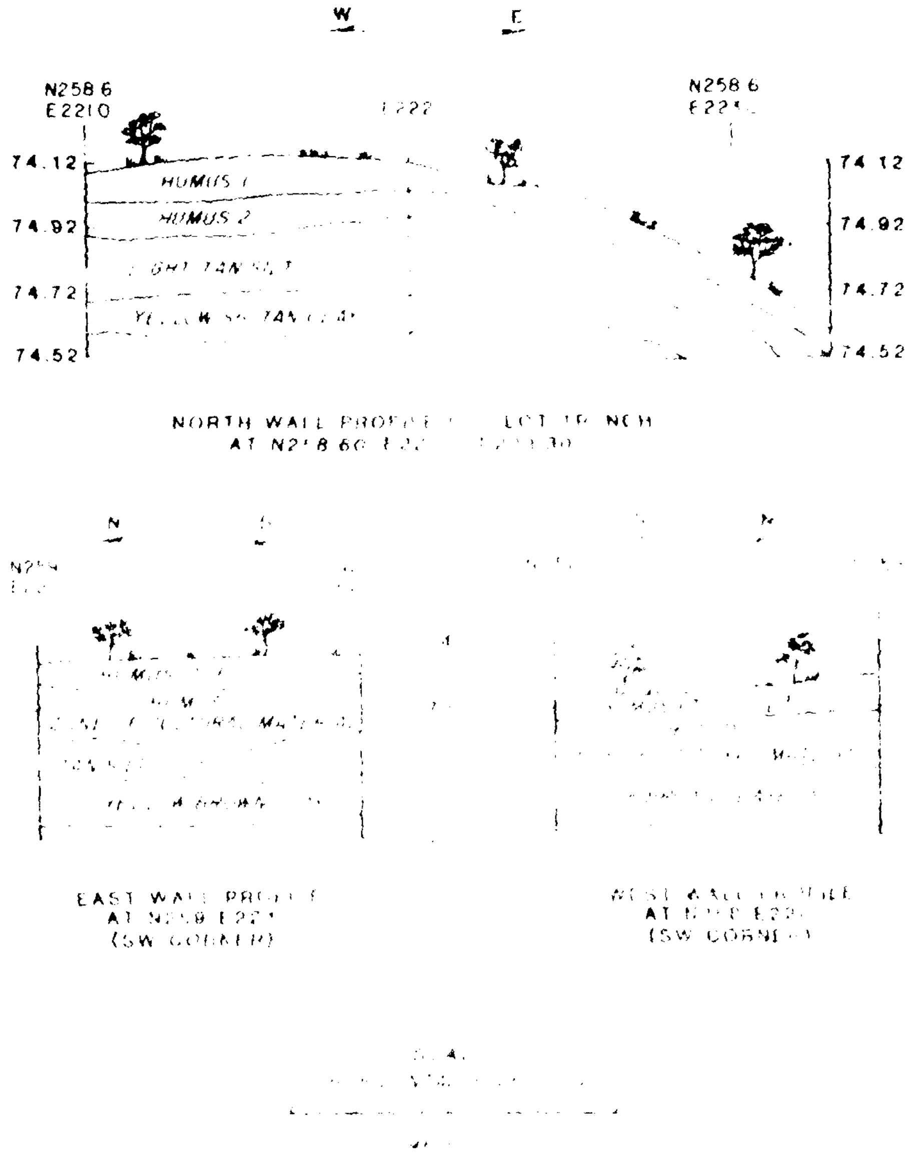


FIGURE 4-9 SITE [illegible] WALL PROFILES OF VARIOUS EXCAVATED UNITS

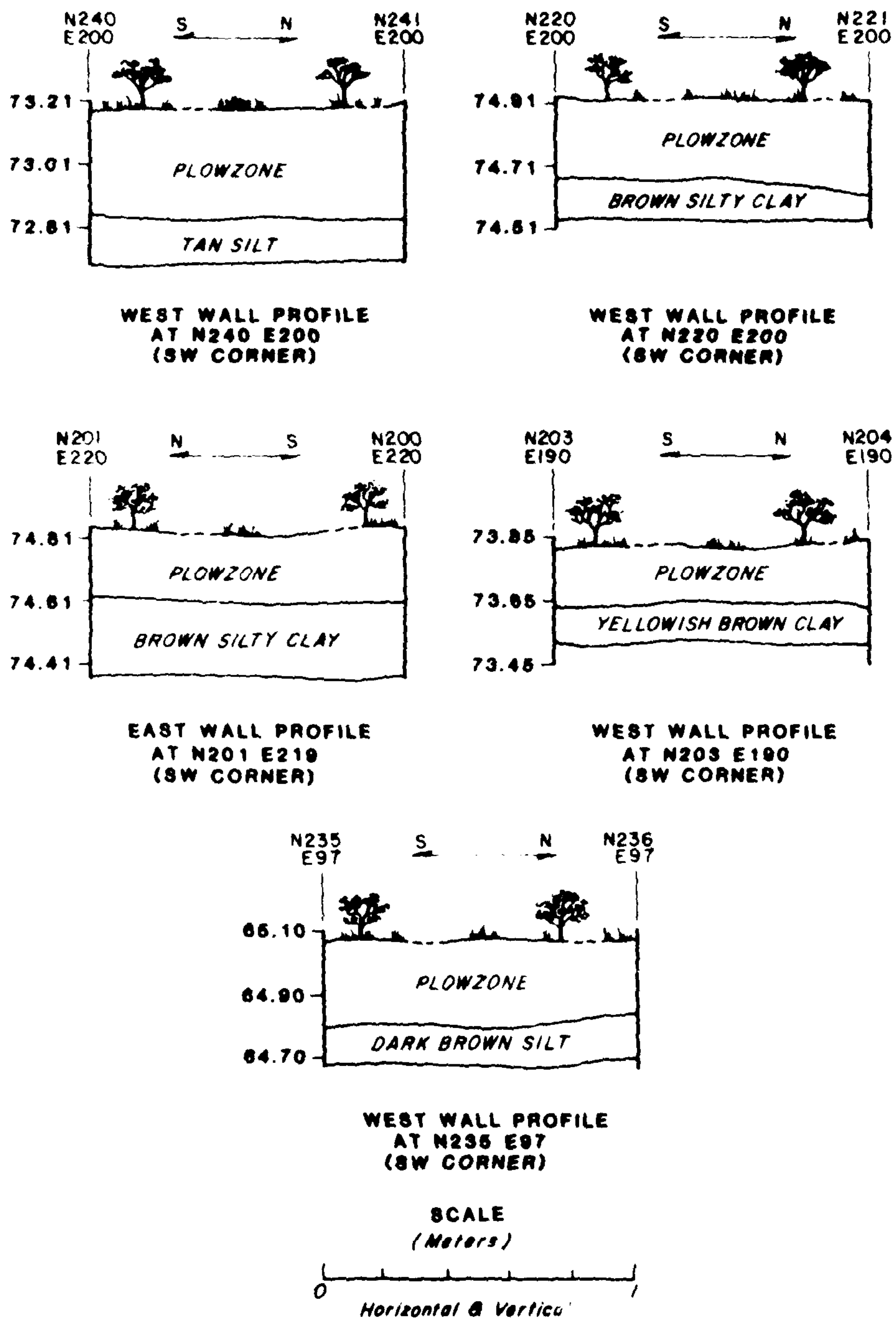


FIGURE 4-10 SITE 23CL229: WALL PROFILES OF VARIOUS EXCAVATED UNITS

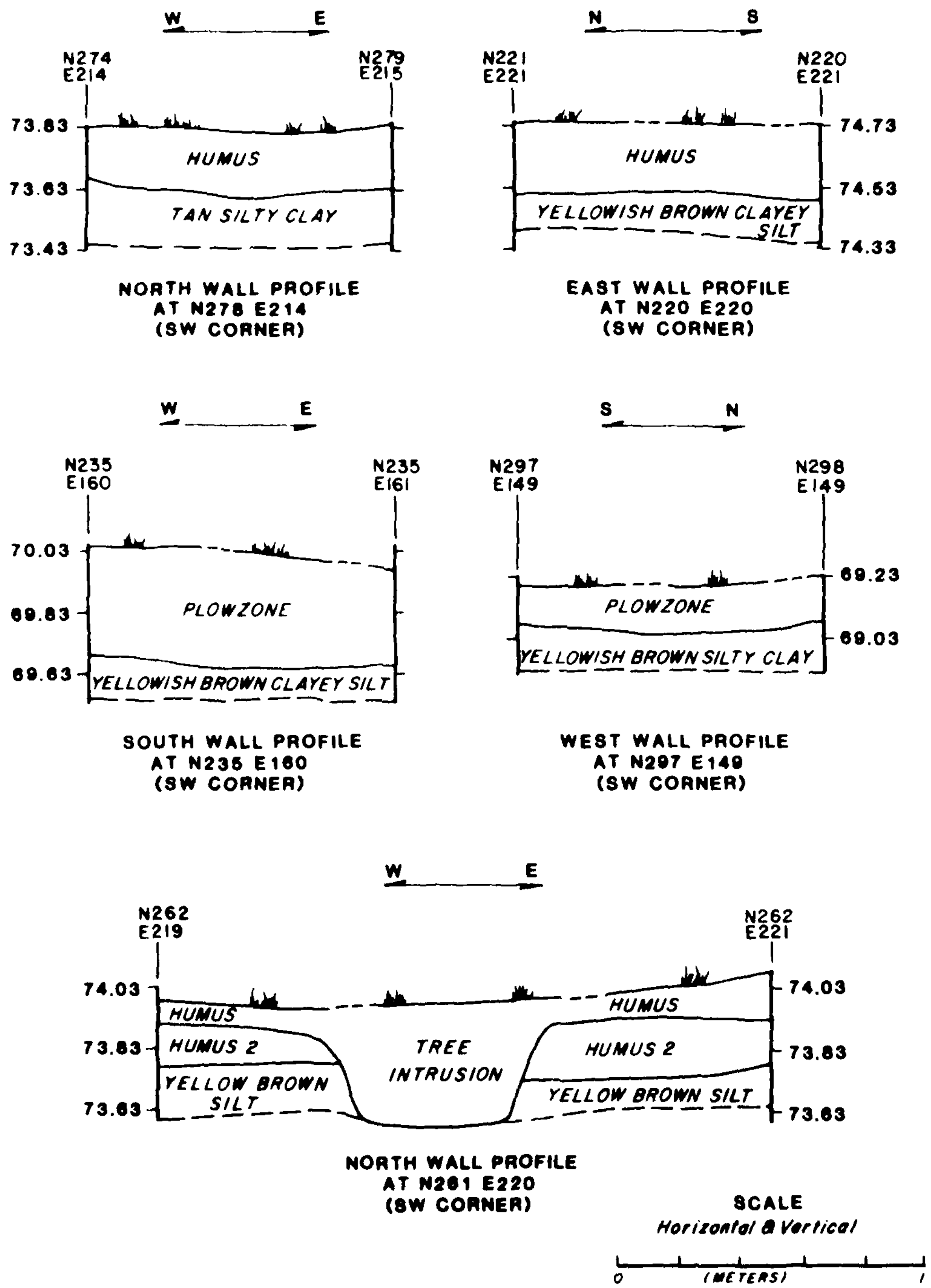
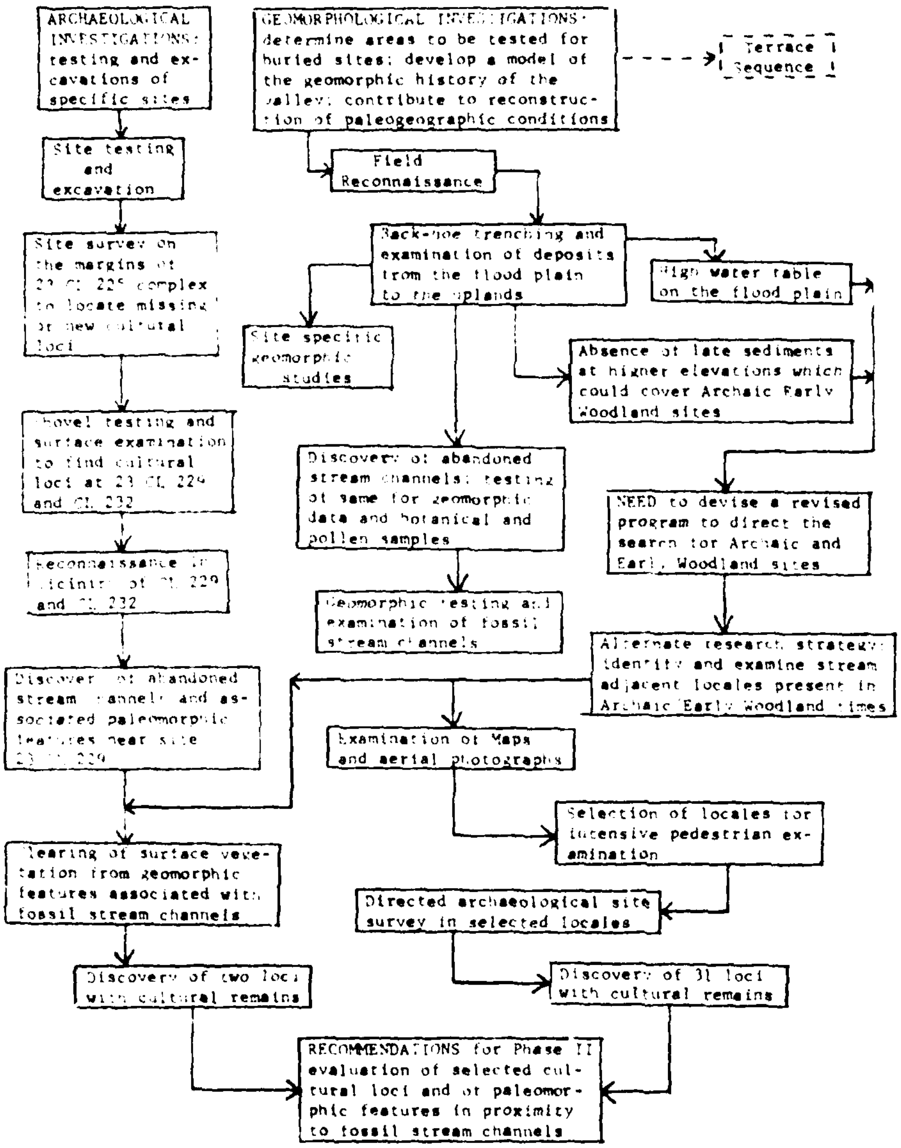


FIGURE 4-11 SITE 23CL229: WALL PROFILES OF VARIOUS EXCAVATED UNITS

FIGURE 4-12 DEVELOPMENT OF THE DIRECTED ARCHAEOLOGICAL SITE SURVEY



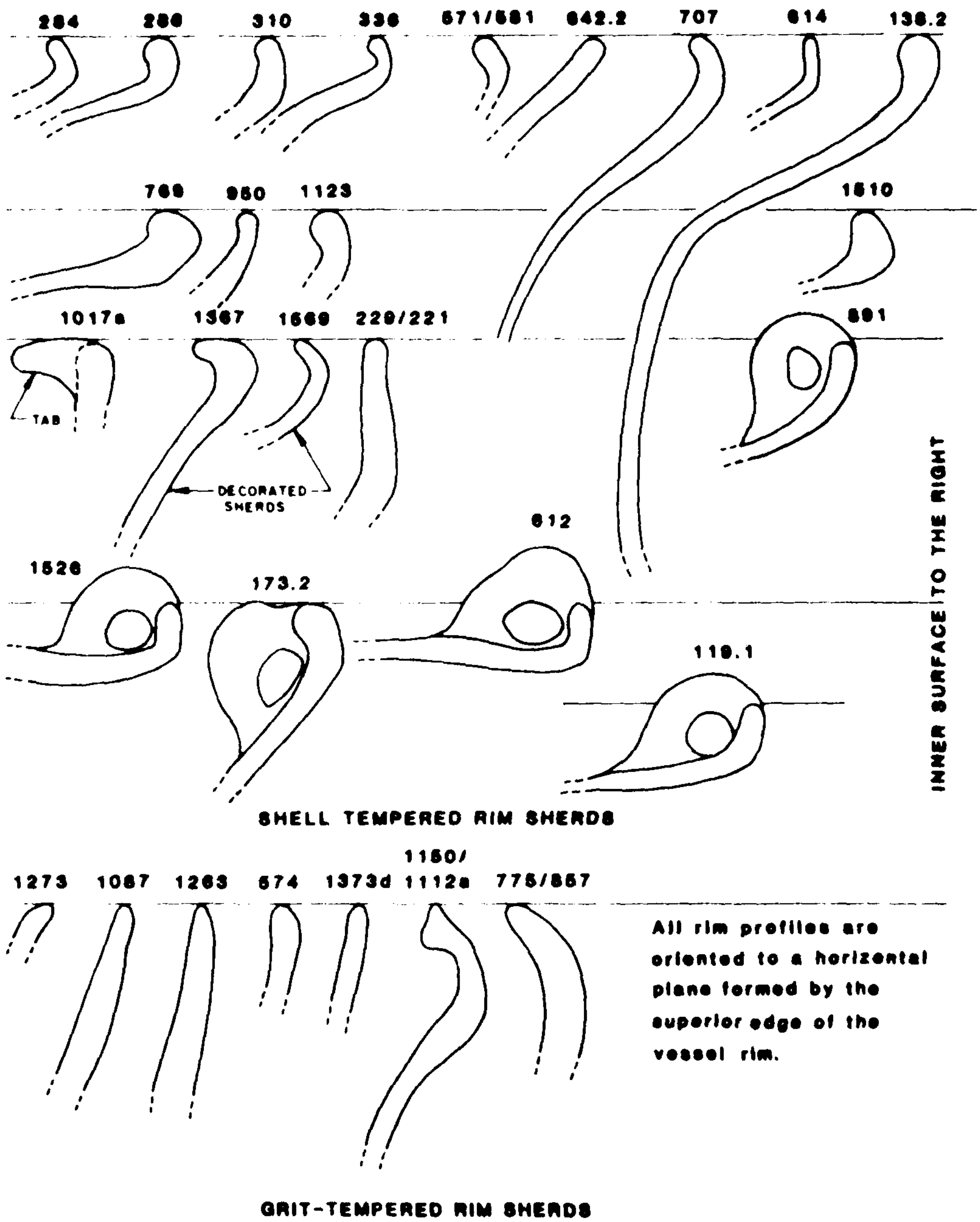
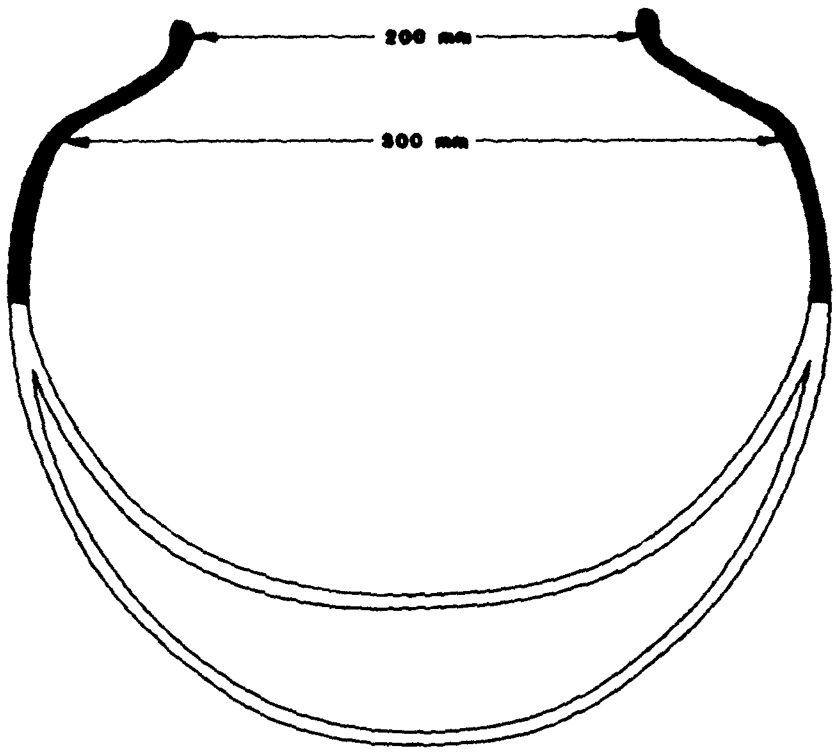


FIGURE 5-1 PROFILES OF RIM SHERDS



The left-hand profile was drawn from the cross-mended sherds. The right-hand profile is the reverse of the former rendering. The size and shape of the lower portion of the vessel are conjectural; two possibilities are shown.

FIGURE 5-2 TWO HYPOTHETICAL RECONSTRUCTIONS OF SHELL-TEMPERED VESSEL FROM FEATURE 201, SITE 23CL226 (Cat. no. 138)

FIGURE 5-3 SITE 23CL276: DECORATED, SHELL-TEMPERED RIM SHERD (Cat. no. 1367)

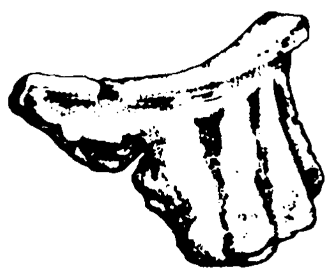
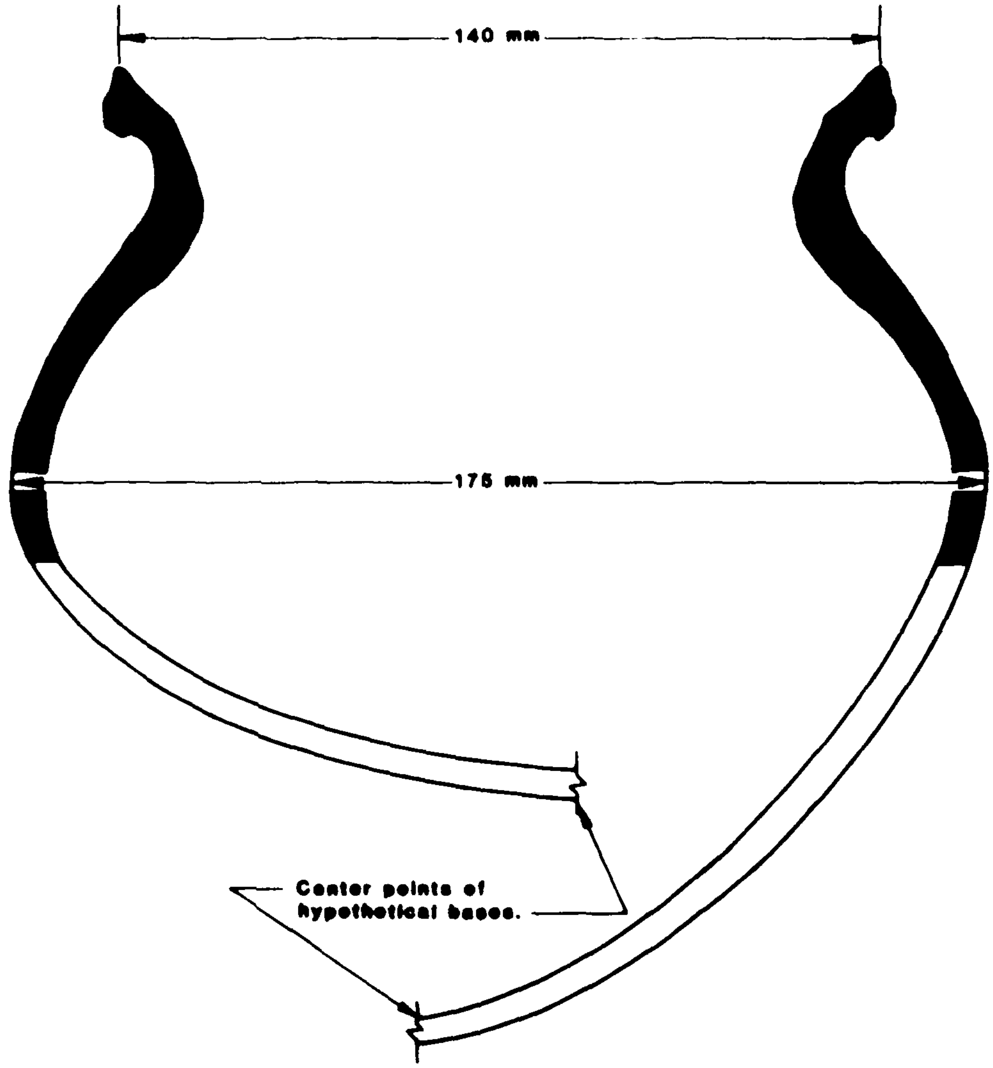


FIGURE 5-4 SITE 23CL276: DECORATED, SHELL-TEMPERED RIM SHERD (Cat. no. 1569)



The left-hand profile was drawn from the cross-mended sherd. The right-hand profile is simply the reverse of the former rendering. The sherd was carefully oriented so that the superior rim-edge formed a horizontal plane. The size and shape of the lower portion of the vessel are conjectural.

FIGURE 5-5 TWO HYPOTHETICAL RECONSTRUCTIONS OF GRIT-TEMPERED, NEBRASKA CULTURE VESSEL (From sherds 1150 and 1112a, site 23CL276)

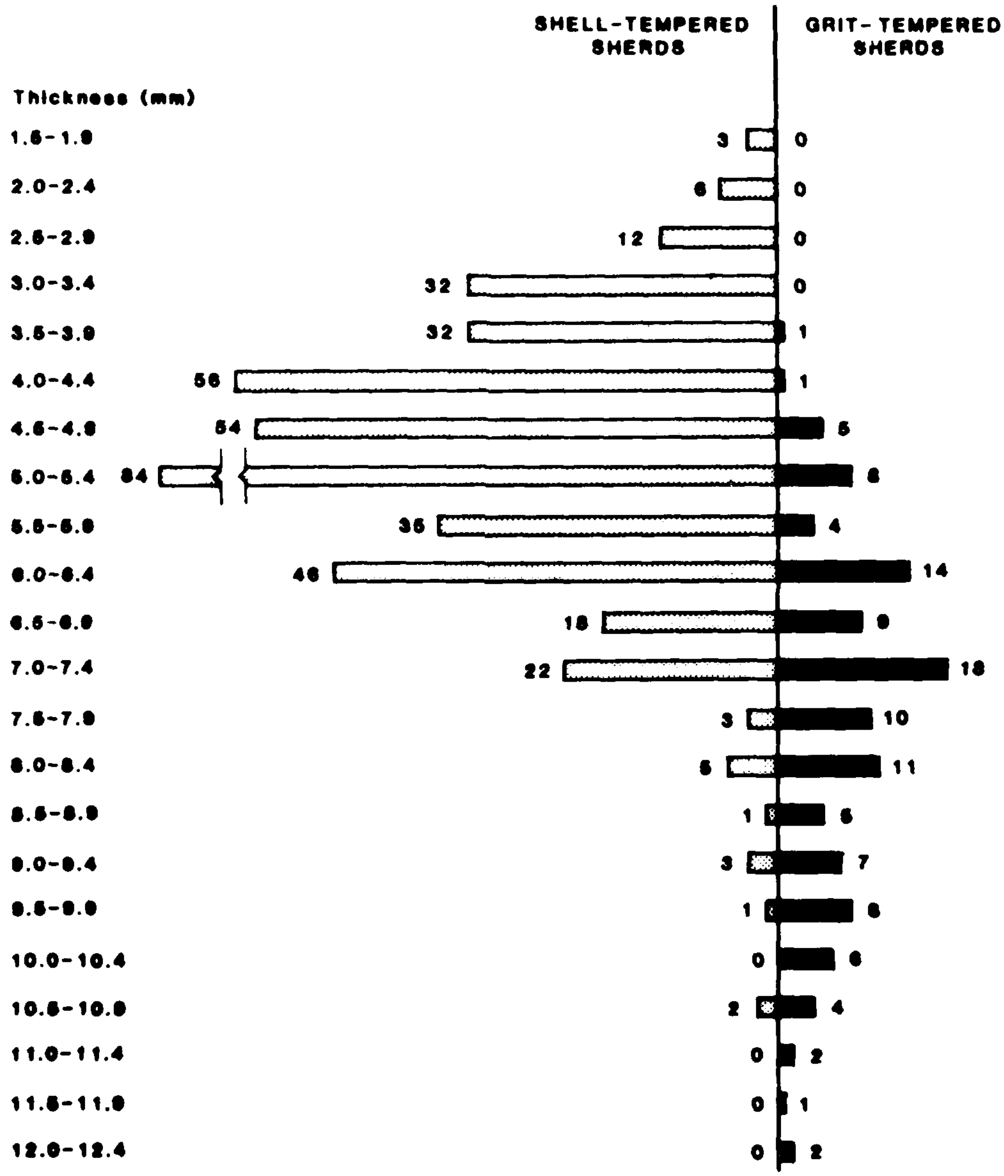


FIGURE 5-6 VARIABILITY IN BODY SHERD THICKNESS AT 23CL276

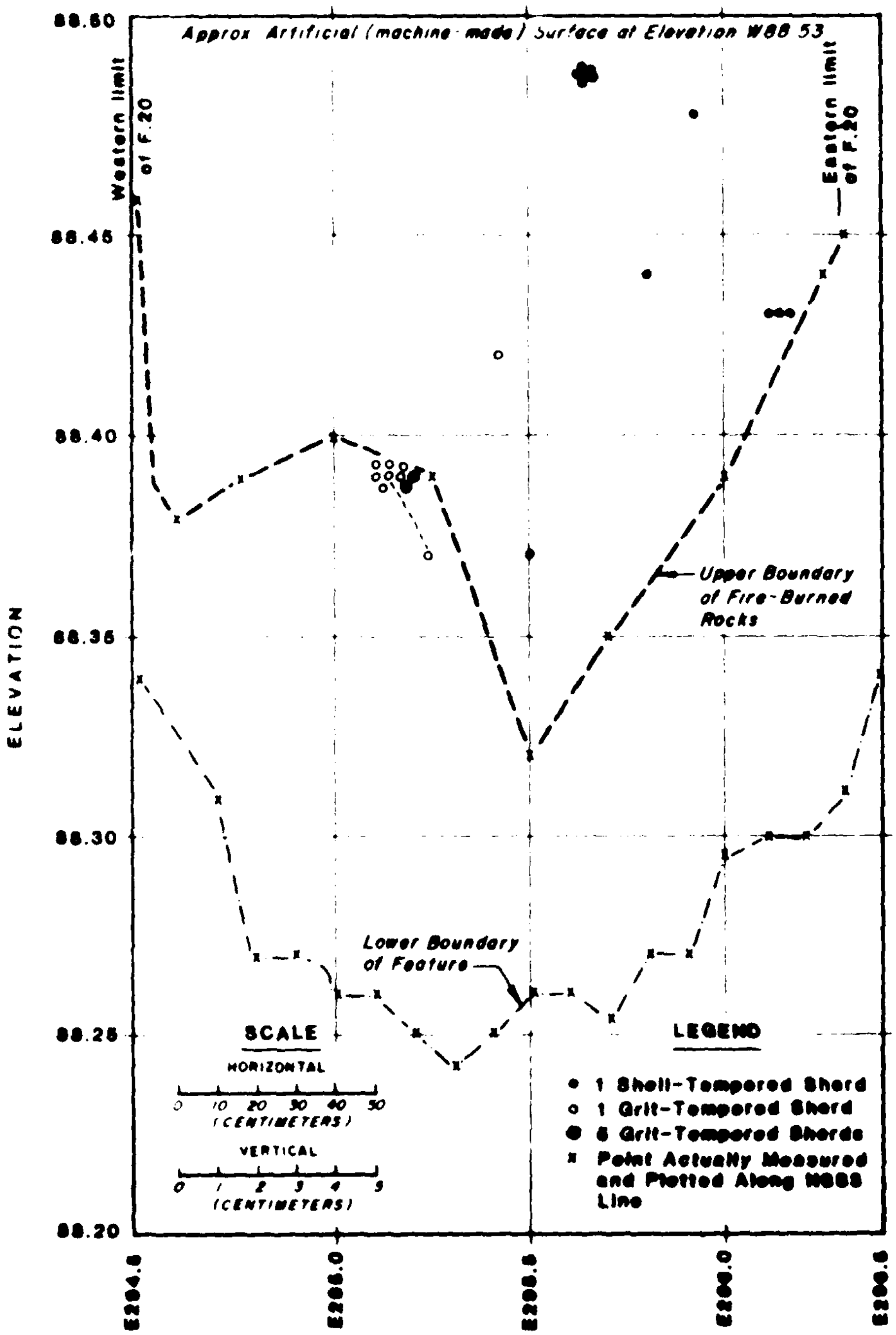


FIGURE 5-7 SITE 23CL276 VERTICAL AND HORIZONTAL (ALONG E-W AXIS) DISTRIBUTION OF POTSHERDS ABOVE AND WITHIN FEATURE 20

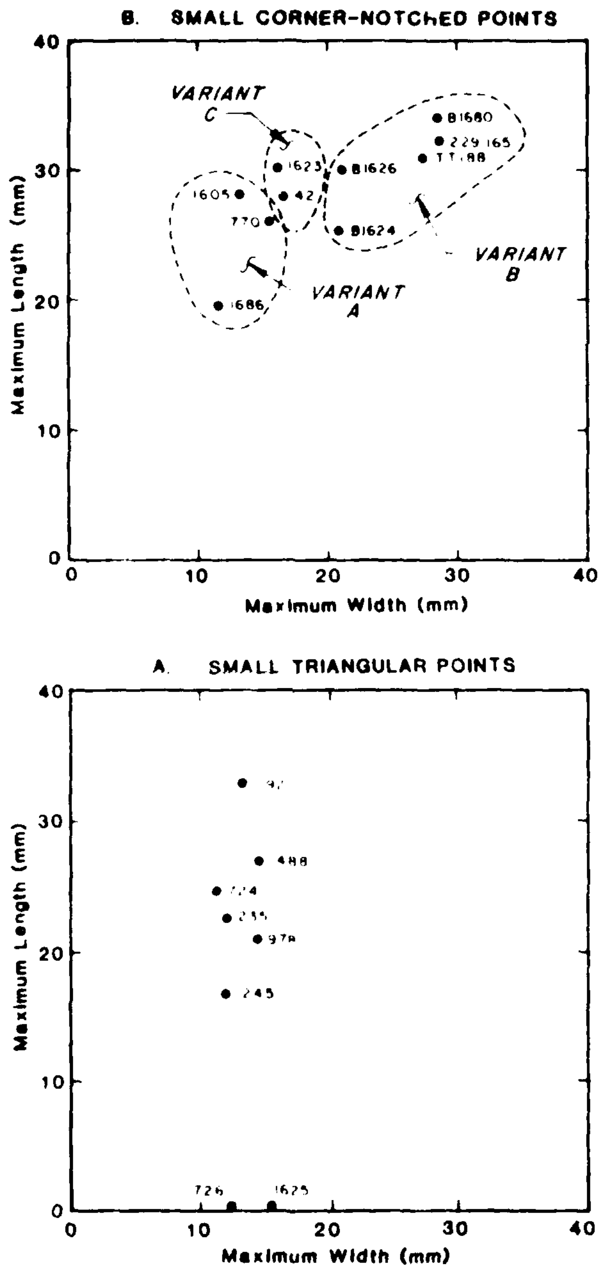


FIGURE 6-1 SMALL TRIANGULAR AND SMALL CORNER-NOTCHED POINTS PLOTTED FOR WIDTH AND LENGTH

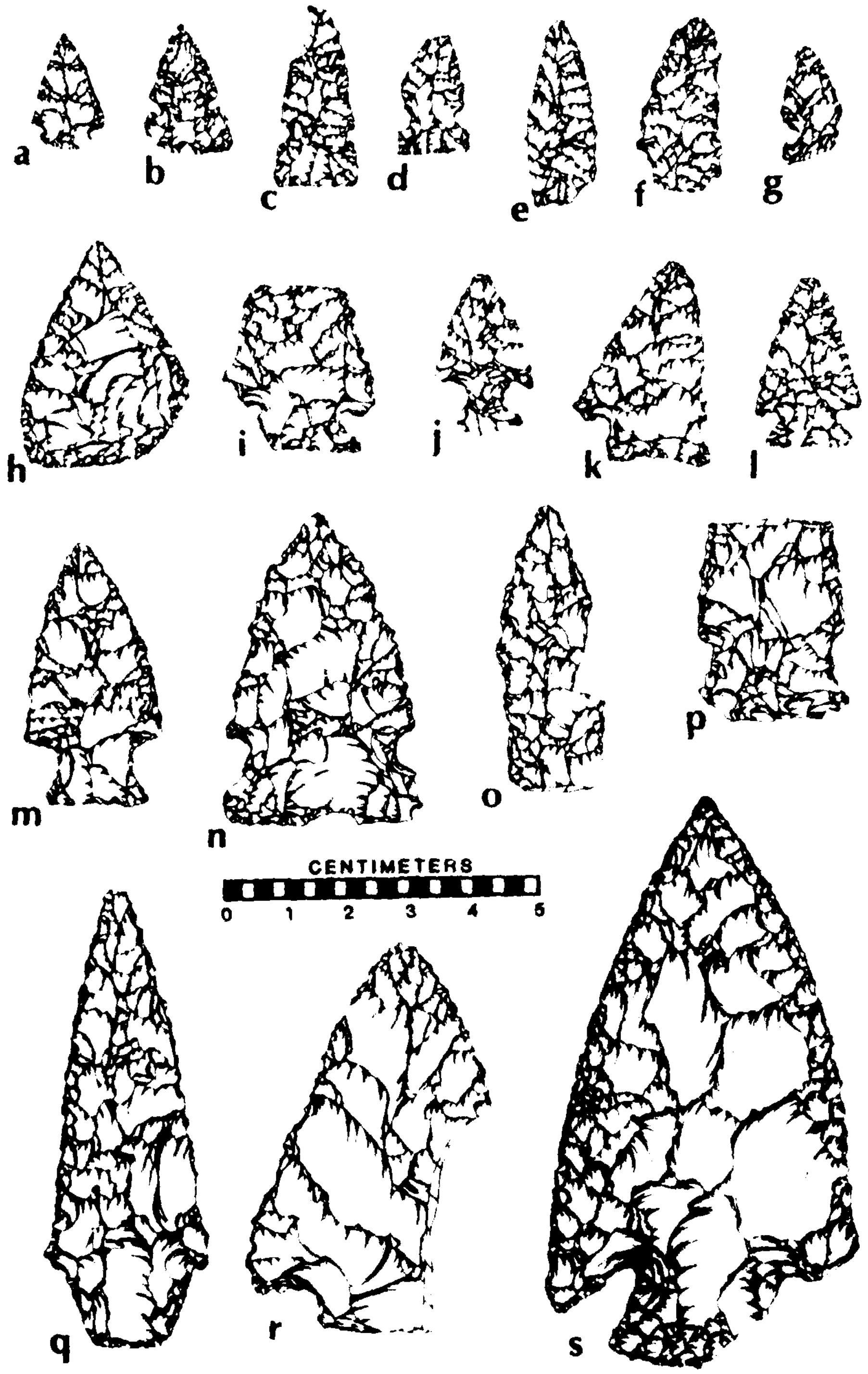


FIGURE 6 - 2 PROJECTILE POINTS

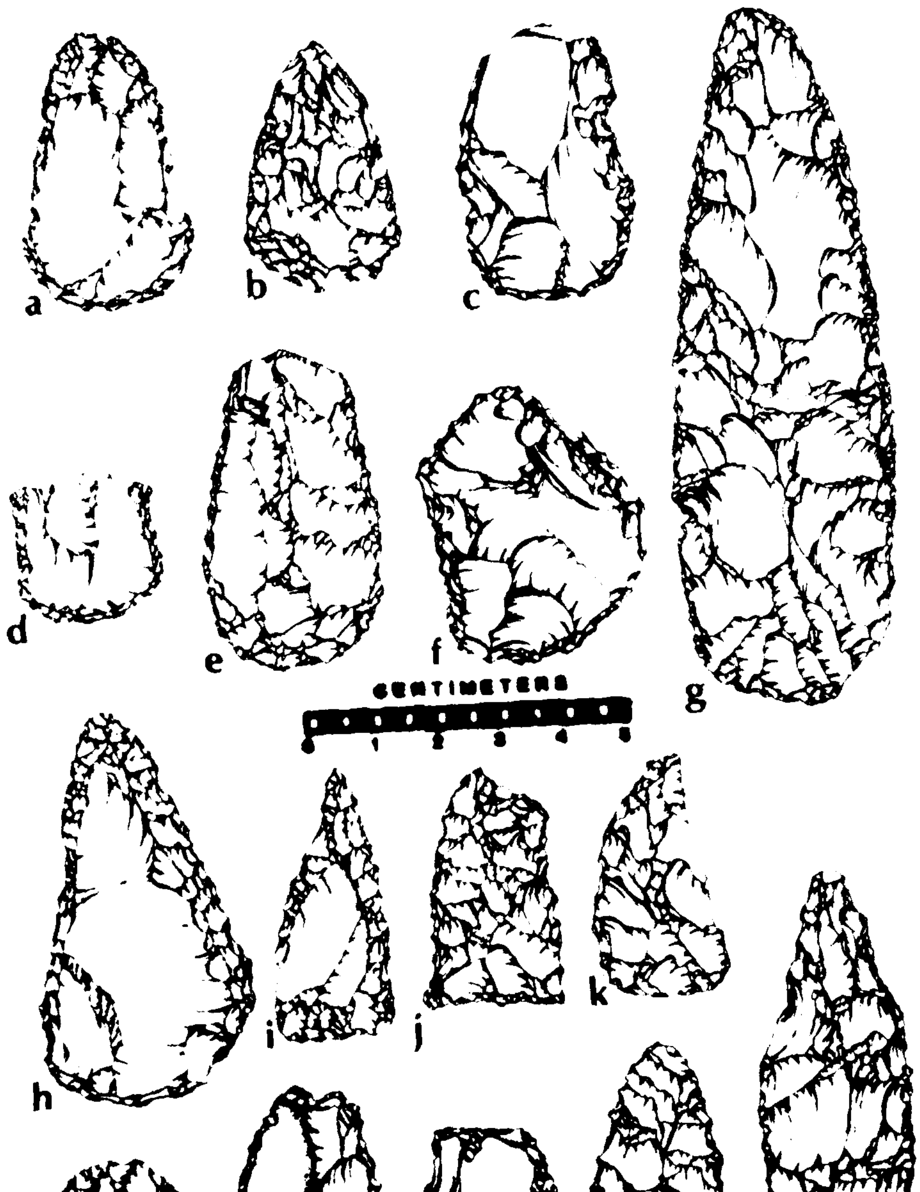


FIGURE 6 - 3 CHIPPED STONE TOOLS

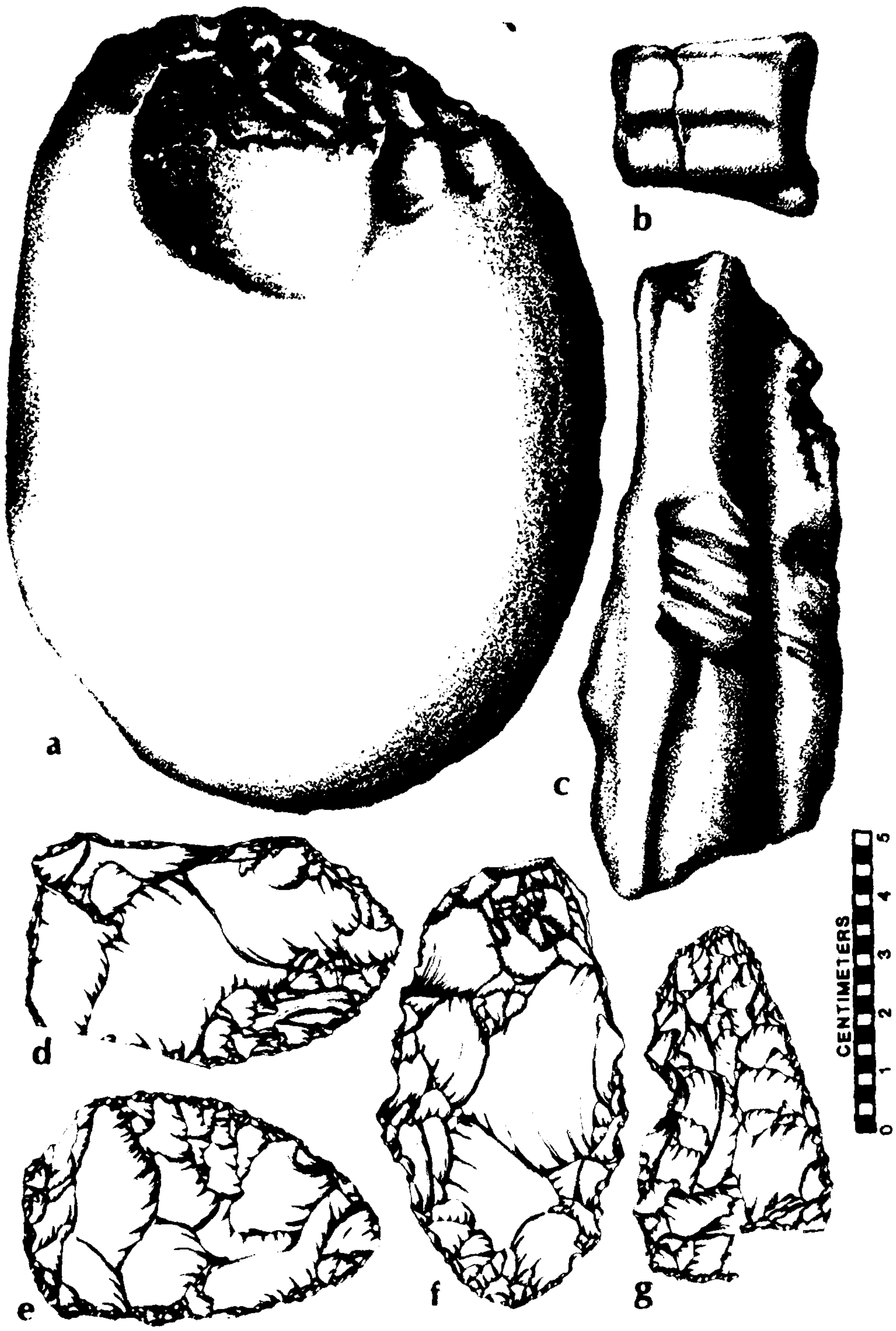


FIGURE 6 - 4 MISCELLANEOUS STONE TOOLS

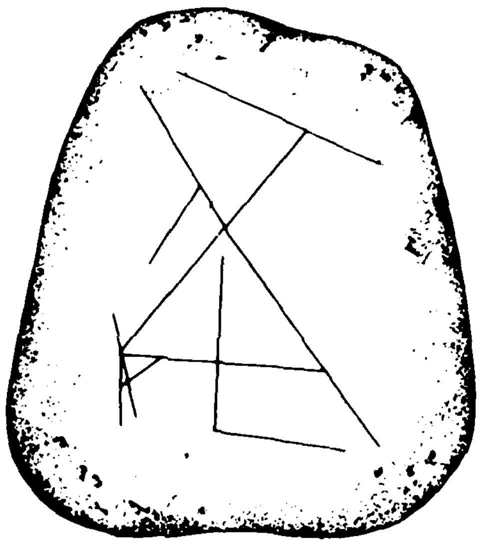


FIGURE 6-5 SKETCH OF POLISHED PEBBLE WITH INSCRIBED DESIGN
(The faintly engraved lines have almost been obliterated by the activity that produced the smooth, polished surface. From Site 23 CL 276; Catalog no. 224; see 6-5b for photograph.)

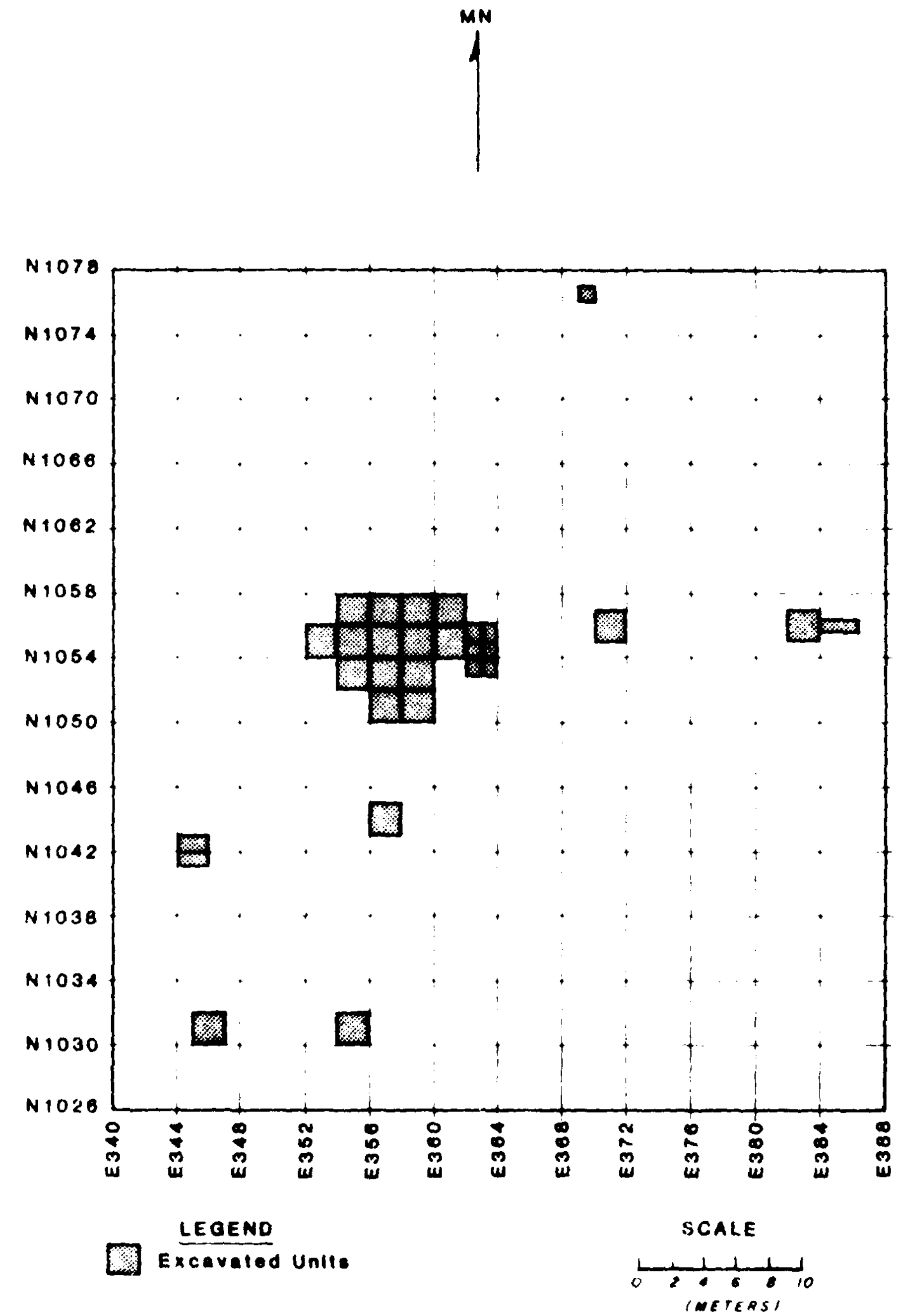


FIGURE 8-1 SITE 23CL274: EXCAVATED UNITS

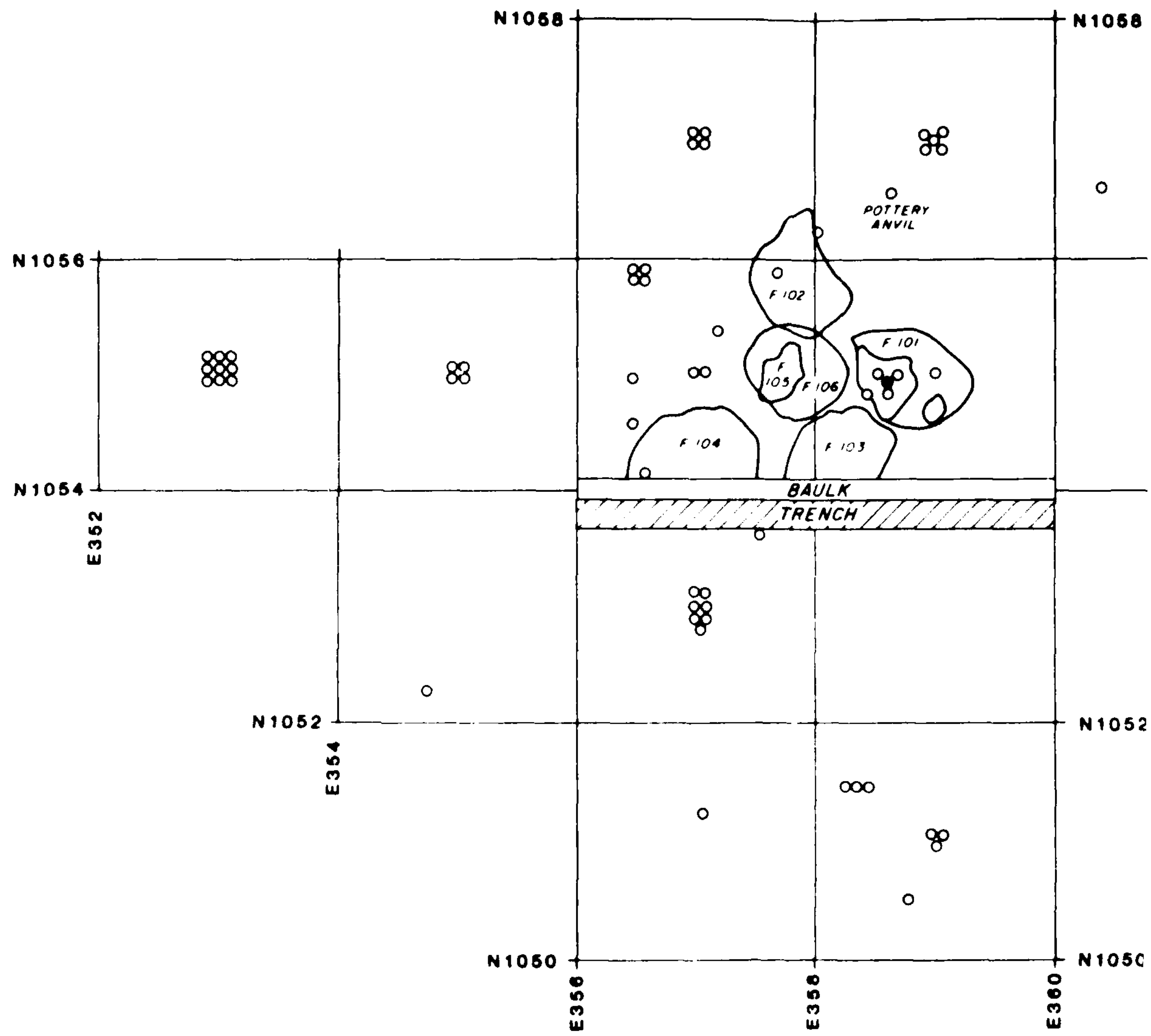
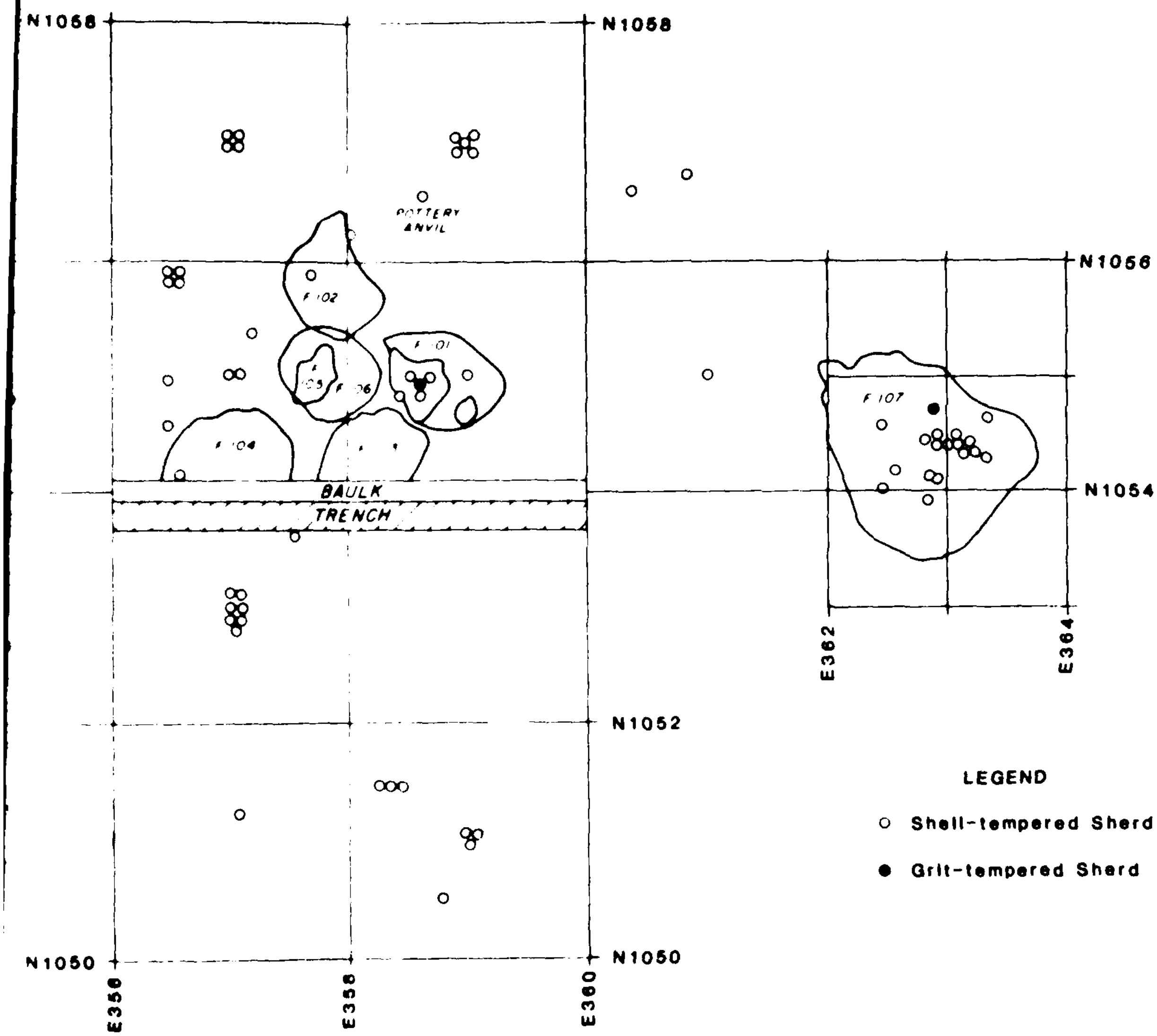


FIGURE 8-2 SITE 23CL274: PLAN VIEW SHOWING EXCA
FEATURES AND POTTERY D



SITE 23CL274: PLAN VIEW SHOWING EXCAVATED AREAS, FEATURES AND POTTERY DISTRIBUTION

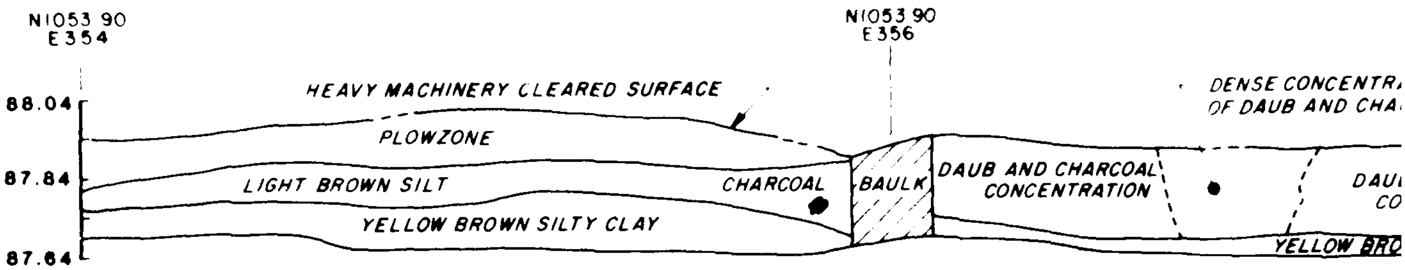
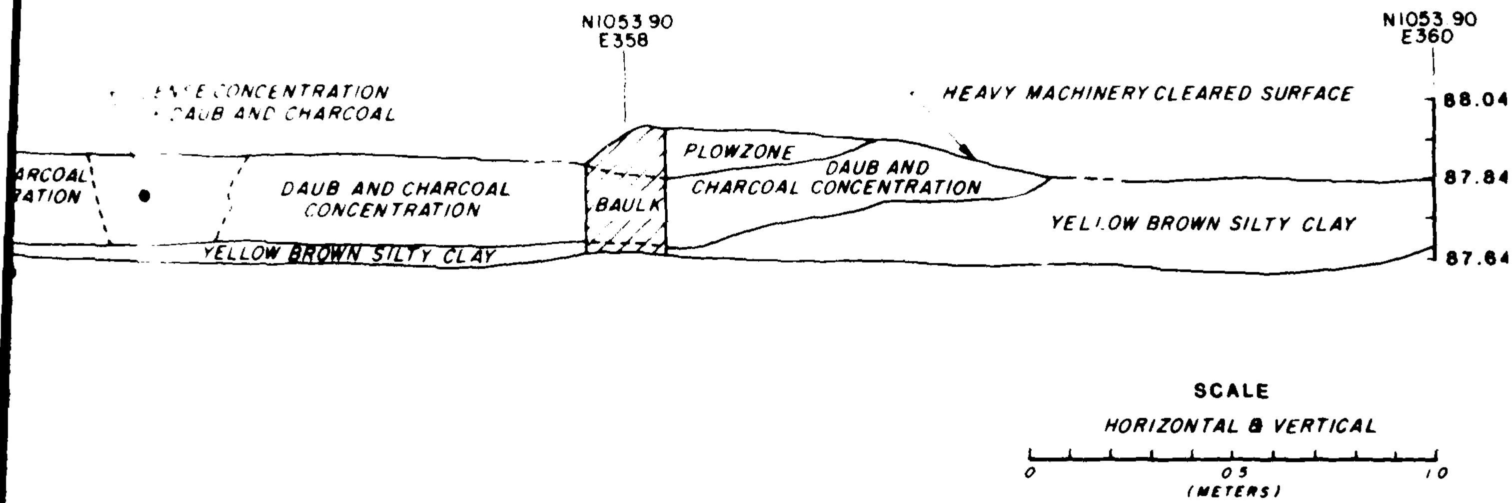


FIGURE 8-3 SITE 23CL274: PROFILE OF TRENCH
DEPICTING DAUB AND CHAI



PROFILE OF TRENCH NORTH WALL AT N1053.10, E354–E360,
ING DAUB AND CHARCOAL CONCENTRATIONS

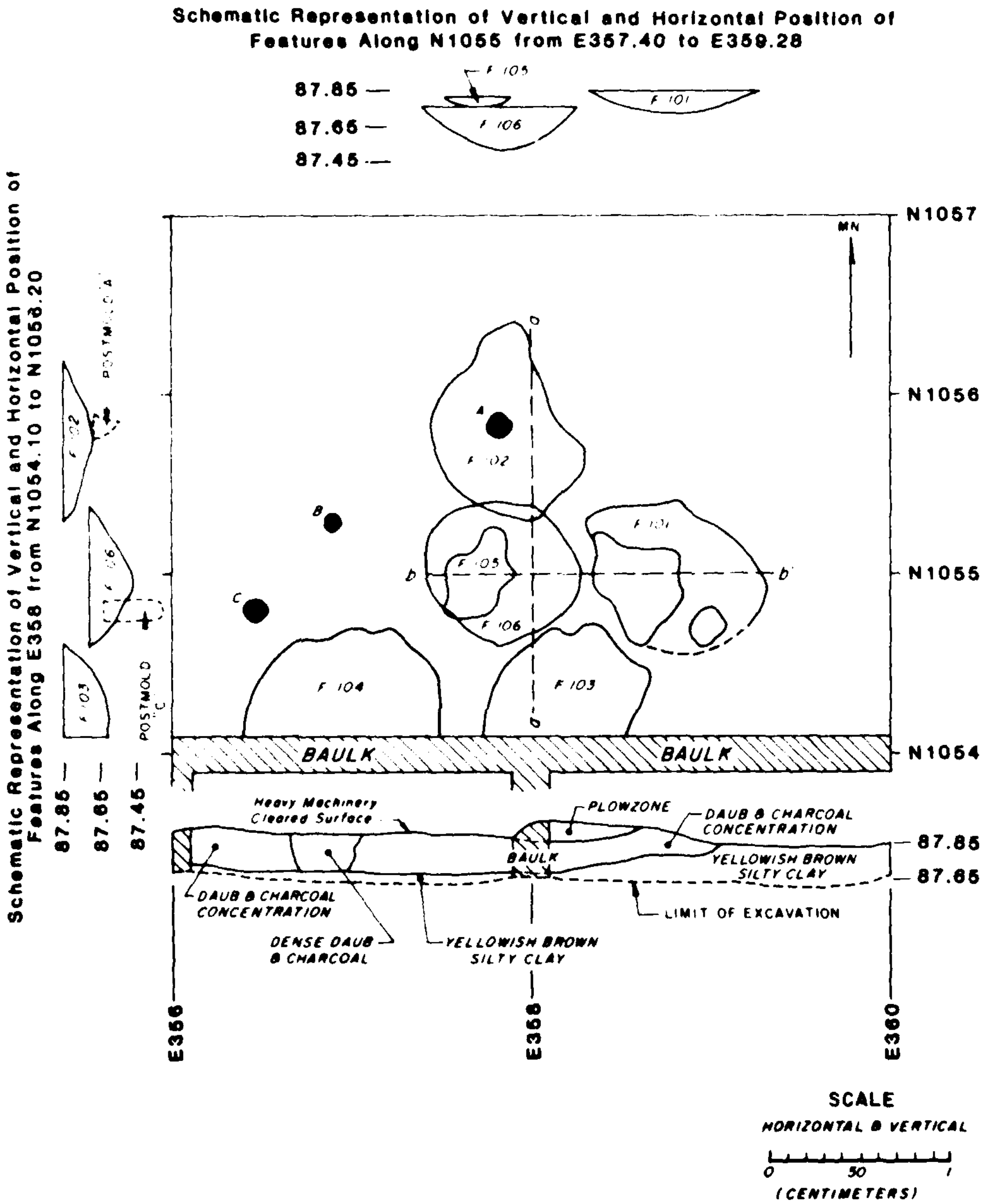


FIGURE 8-4 SITE 23CL274
FEATURES, POSTMOLDS, AND PROFILES

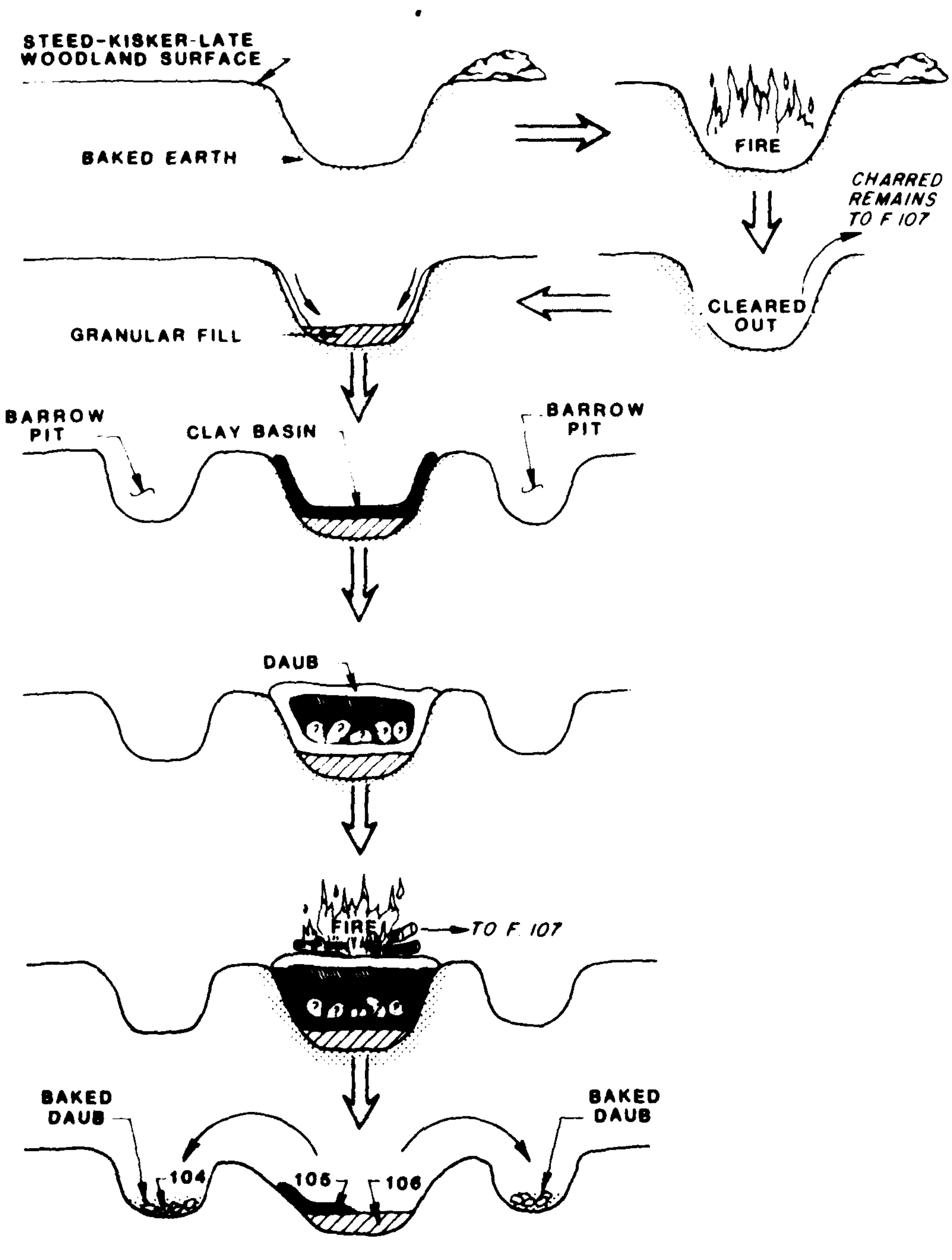


FIGURE 8-5 SITE 23CL274: HYPOTHETICAL SEQUENCE OF EVENTS LEADING TO THE FORMATION OF FEATURES 101-106

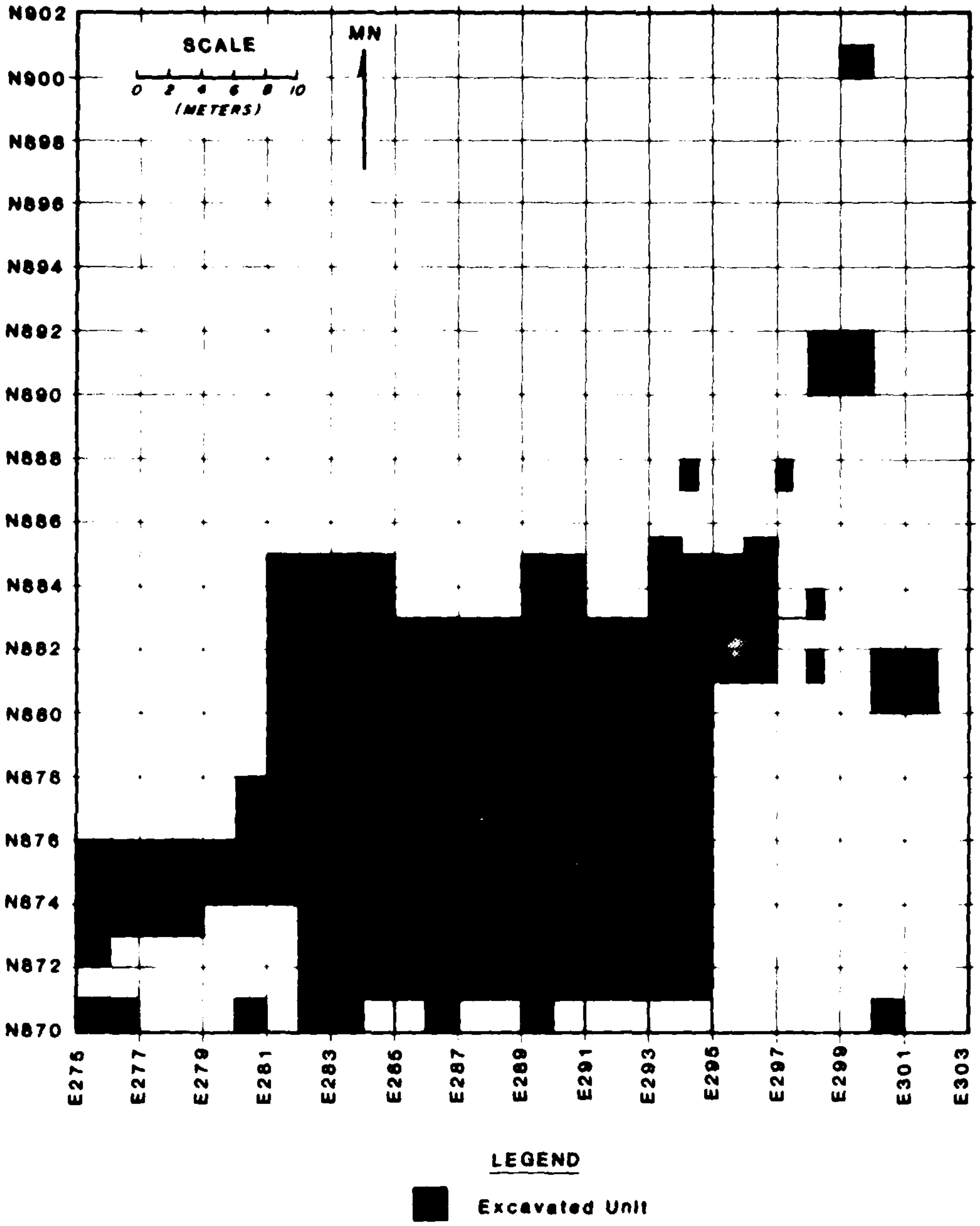
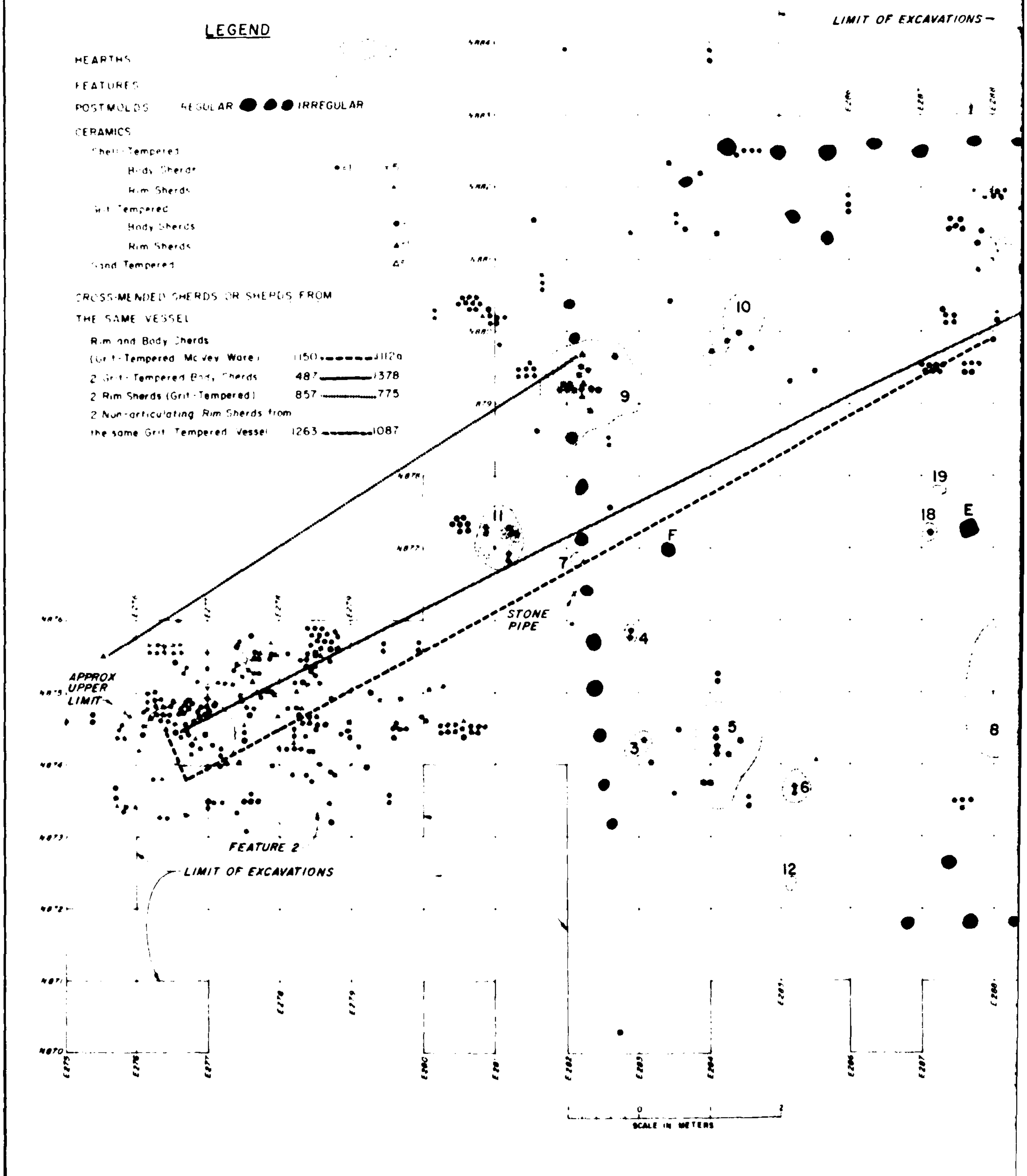
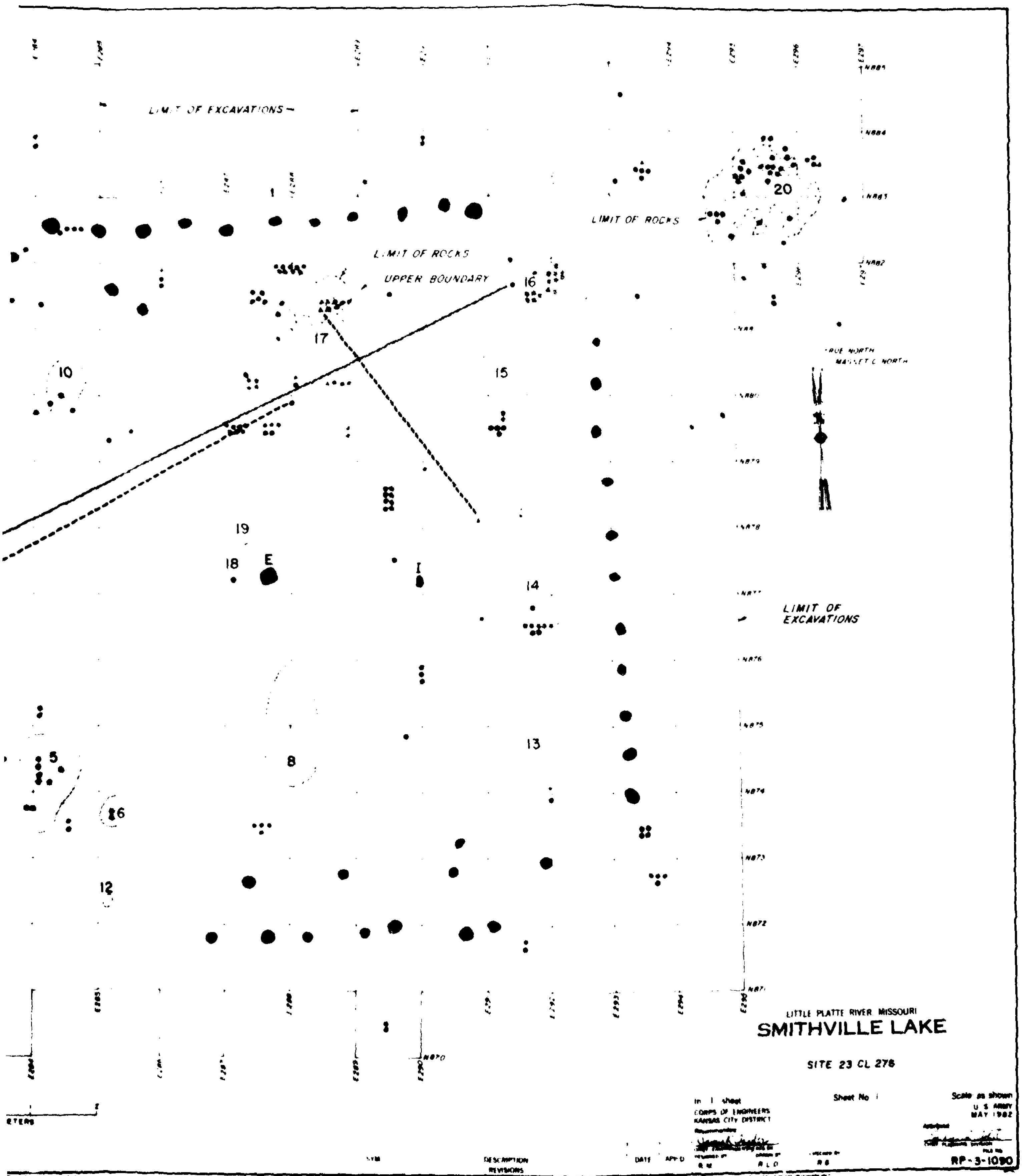


FIGURE 8-6 SITE 23CL276: EXCAVATED UNITS

FIGURE 8-7
SITE 23 CL 276
MAP SHOWING THE DISTRIBUTION OF POSTMOLDS, FEATURES AND POTTERY




LIMIT OF EXCAVATIONS
LIMIT OF ROCKS
LIMIT OF ROCKS
UPPER BOUNDARY
TRUE NORTH
MAGNETIC NORTH
LIMIT OF EXCAVATIONS
1
5
8
10
12
13
14
15
16
17
18
19
20
E
I
LITTLE PLATTE RIVER MISSOURI
SMITHVILLE LAKE
SITE 23 CL 278
Sheet No. 1
Scale as shown
U. S. ARMY
MAY 1982
CORPS OF ENGINEERS
KANSAS CITY DISTRICT
DESCRIPTION
REVISIONS
DATE
RP-3-1090

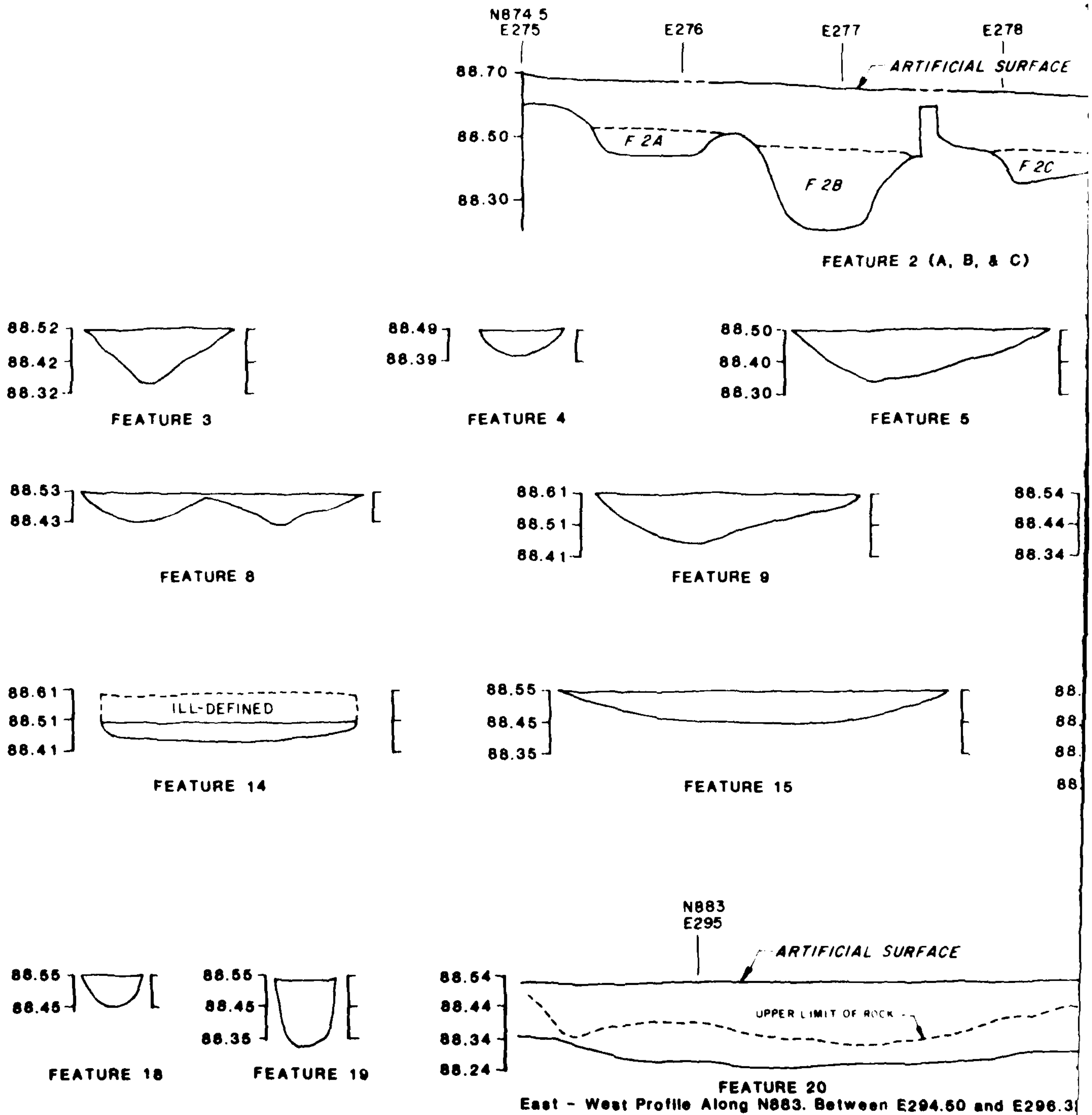
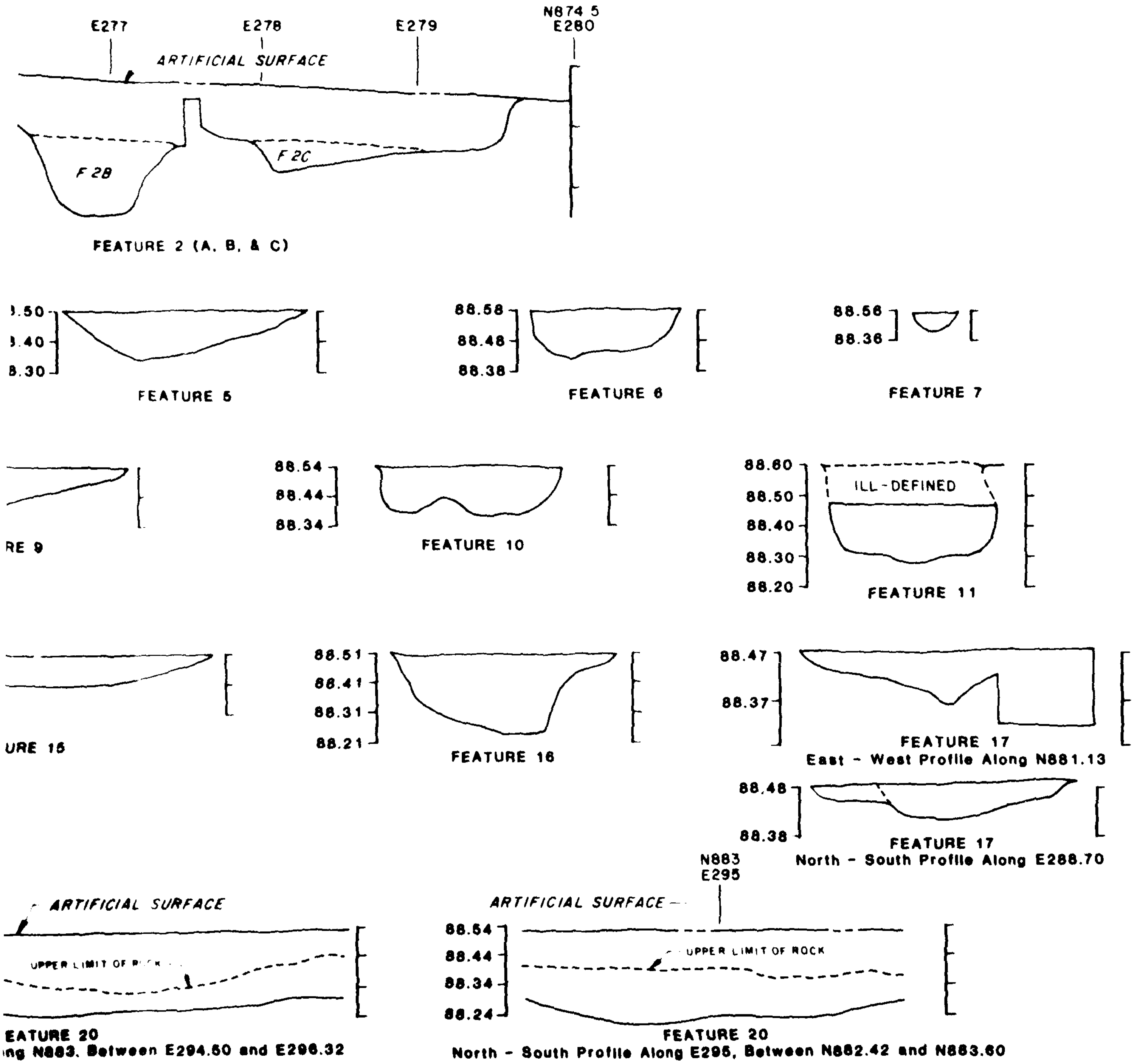


FIGURE 8-8 SITE 23CL276: PROFILES



B SITE 23CL276: PROFILES OF FEATURES

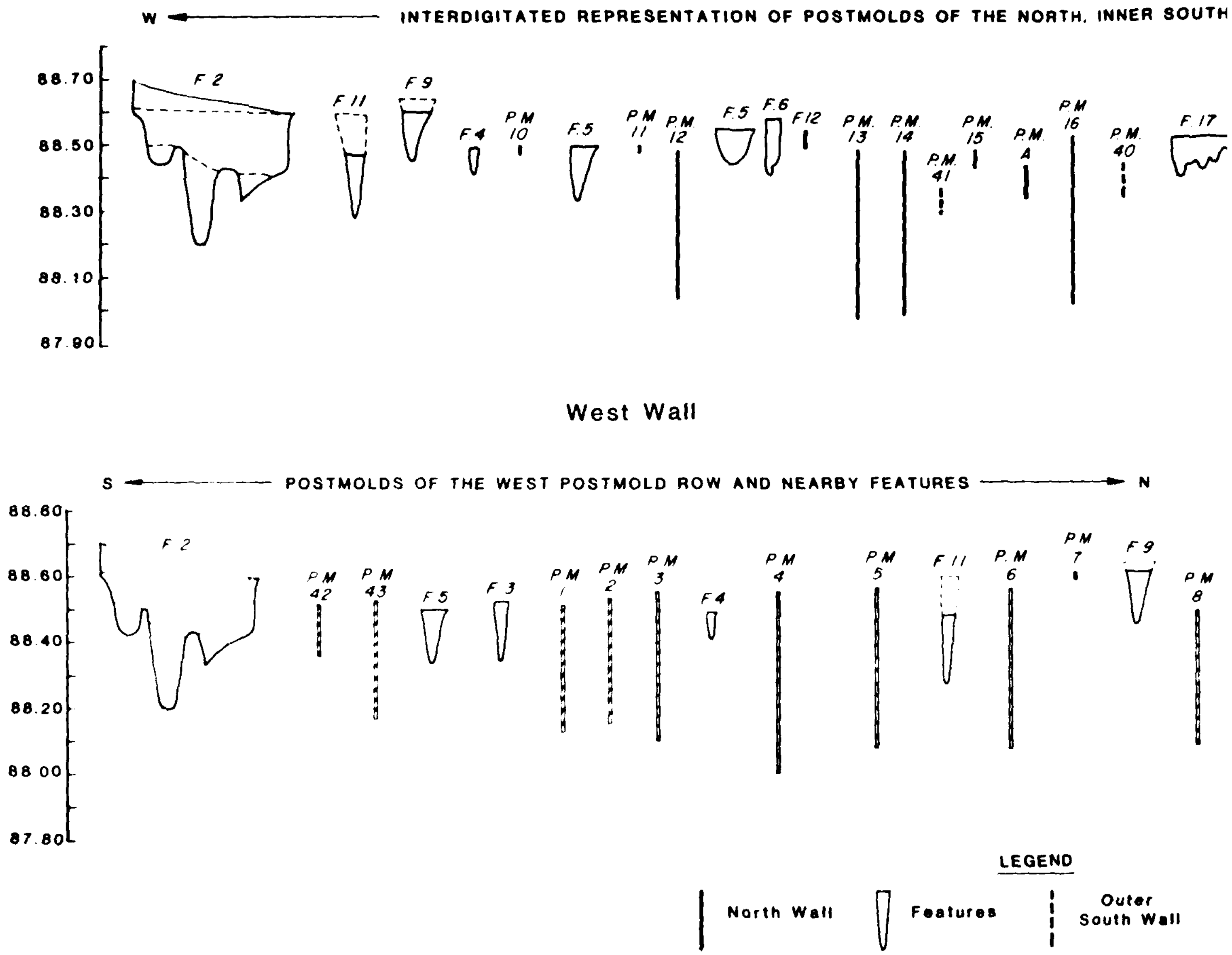
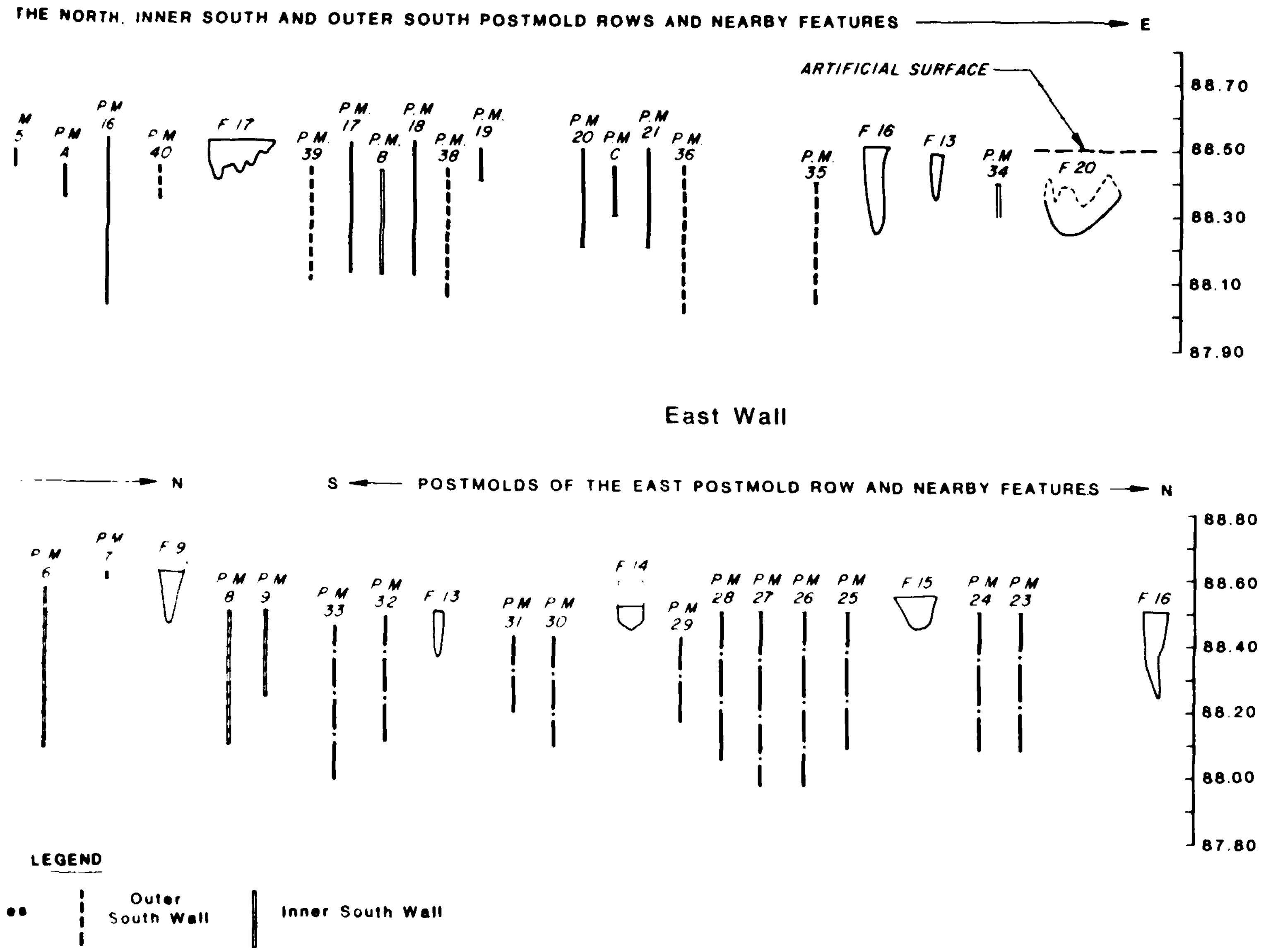


FIGURE 8-9 SCHEMATIC REPRESENTATION OF THE VERTICAL DISTRIBU



RTICAL DISTRIBUTION OF POSTMOLDS AND FEATURES AT SITE 23CL276

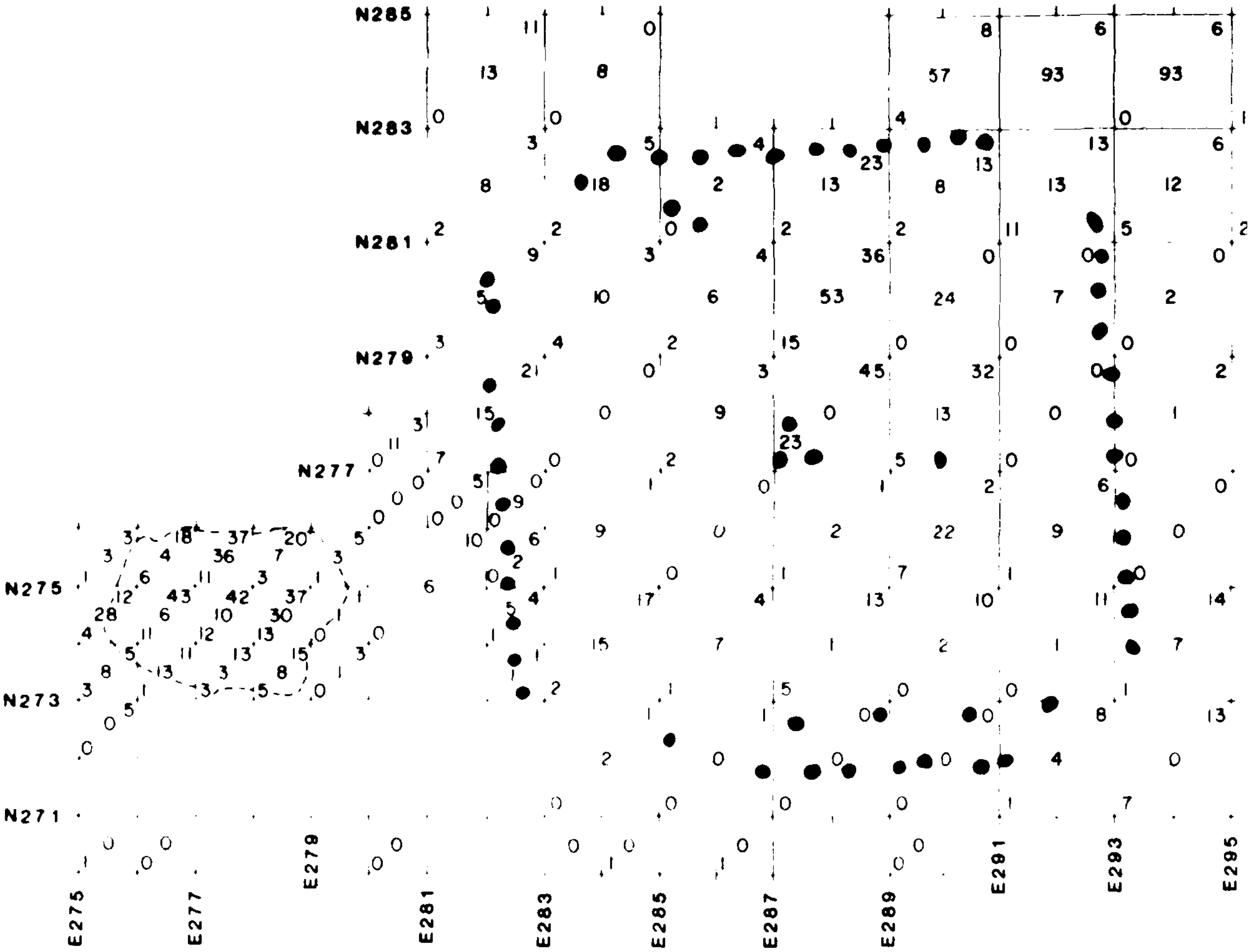
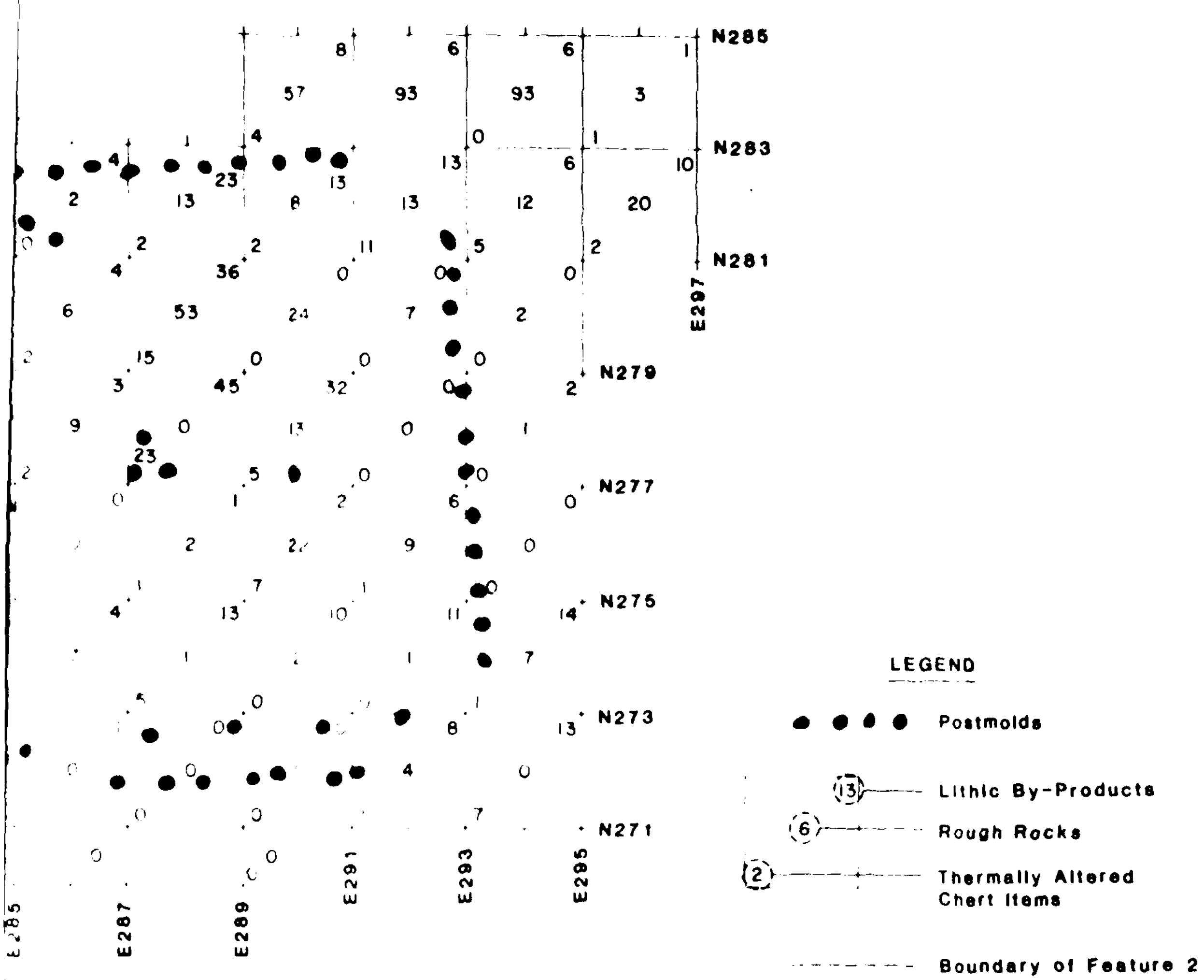


FIGURE 8-10 SITE 23CL276: HORIZONTAL DISTRIBUTION OF ROUGH F
AND THERMALLY AL



)RIZONTAL DISTRIBUTION OF ROUGH ROCKS, CHIPPED STONE BY-PRODUCTS AND THERMALLY ALTERED CHERT ITEMS

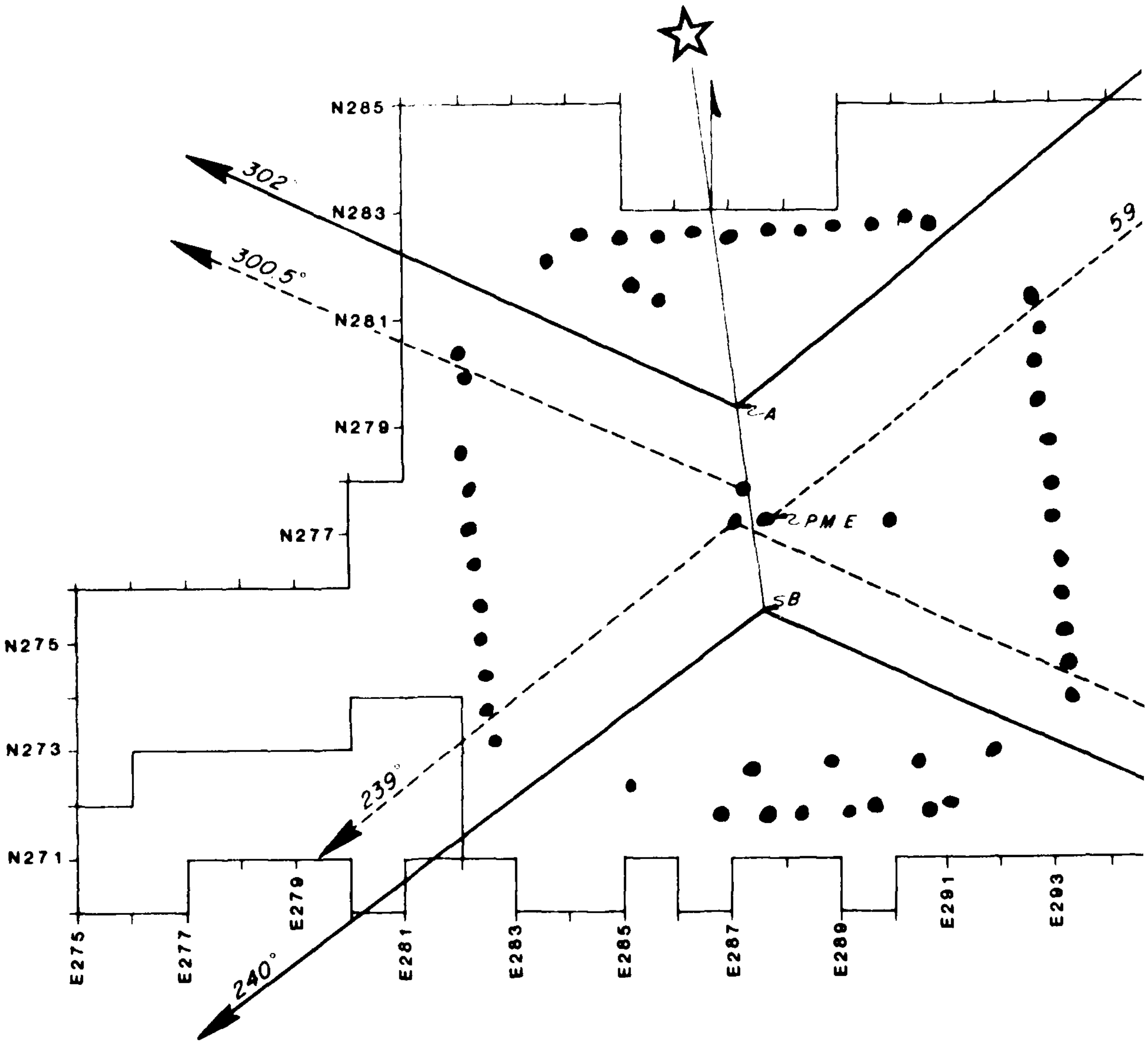
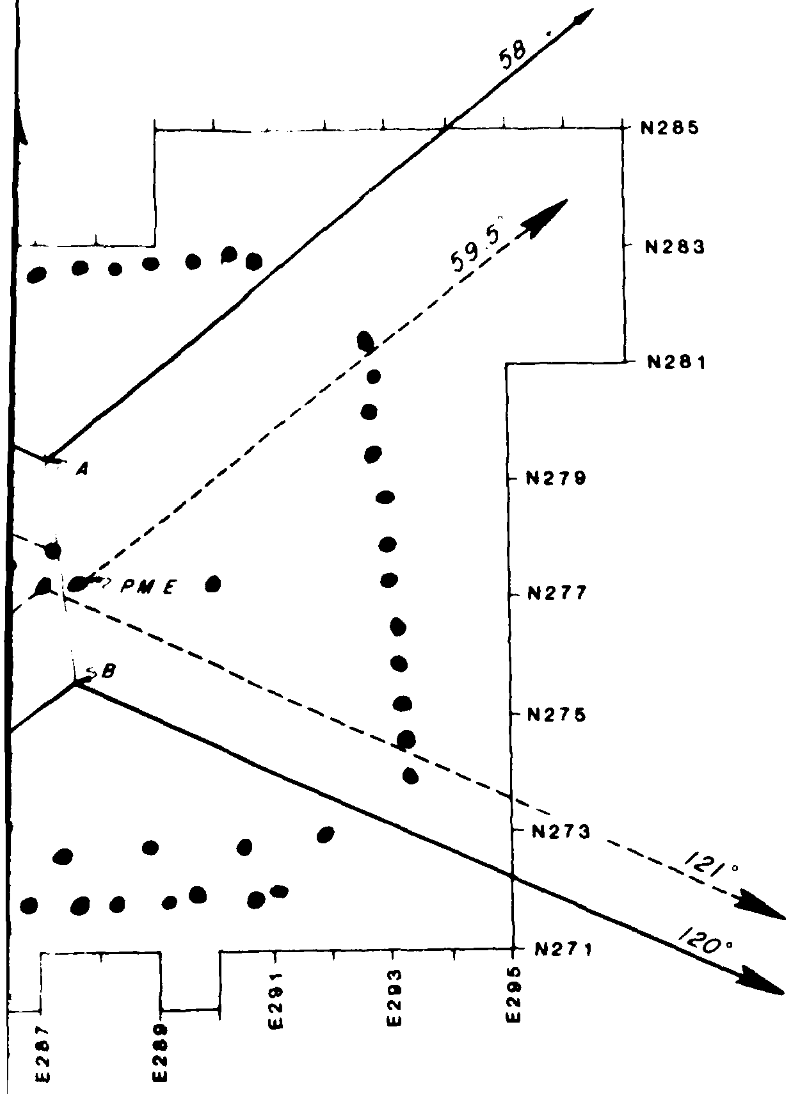


FIGURE 8-11 SITE 23CL276: AZIMUTH ANGLES FOR THE SUMMER AND WIN
SUNRISE AND SUNSET FOR A.D.1000



The solid azimuth lines that emanate from the two offset points (58°, 120°, 240° and 302°) are close approximations of the solticial sunrise and set points based on 39 N. latitude and a zero degree horizon. The dashed azimuth lines that emanate from one or another of the central postmolds or pits are closer approximations using the one degree horizon that exists now and the 39.4° latitude of the site (see Table 8-8 for the calculations).

LEGEND

A, B	Offset Points
● ● ● ●	Postmolds
PM E	Geometric Center

:S FOR THE SUMMER AND WINTER SOLSTICIAL
ND SUNSET FOR A.D.1000

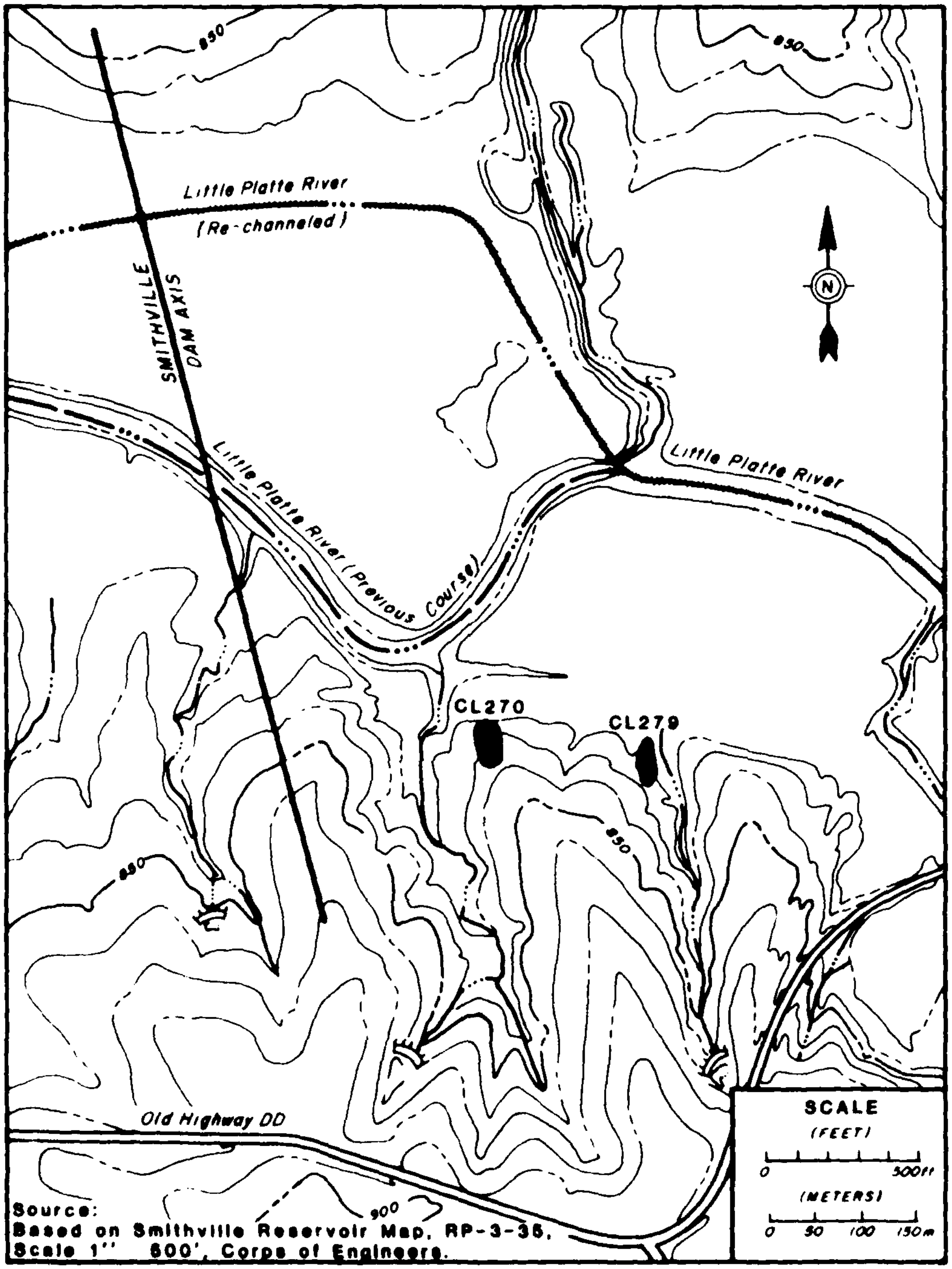


FIGURE C-1 LOCATIONS AND LIMITS OF SITES 23CL279 AND 23CL270.

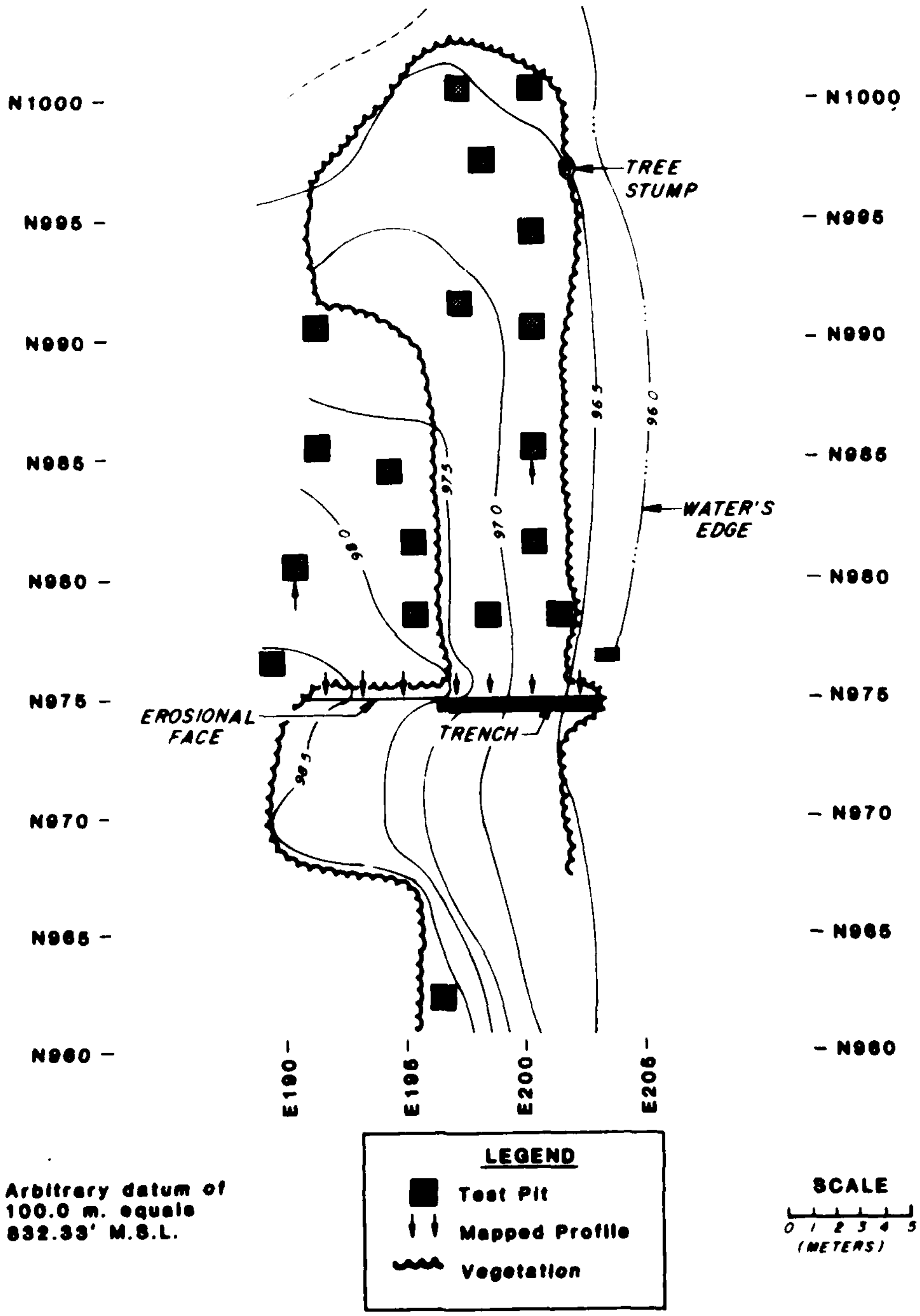


FIGURE C-2 SITE 23CL279: DISTRIBUTION OF TEST PITS, TRENCH AND EROSIONAL FACE

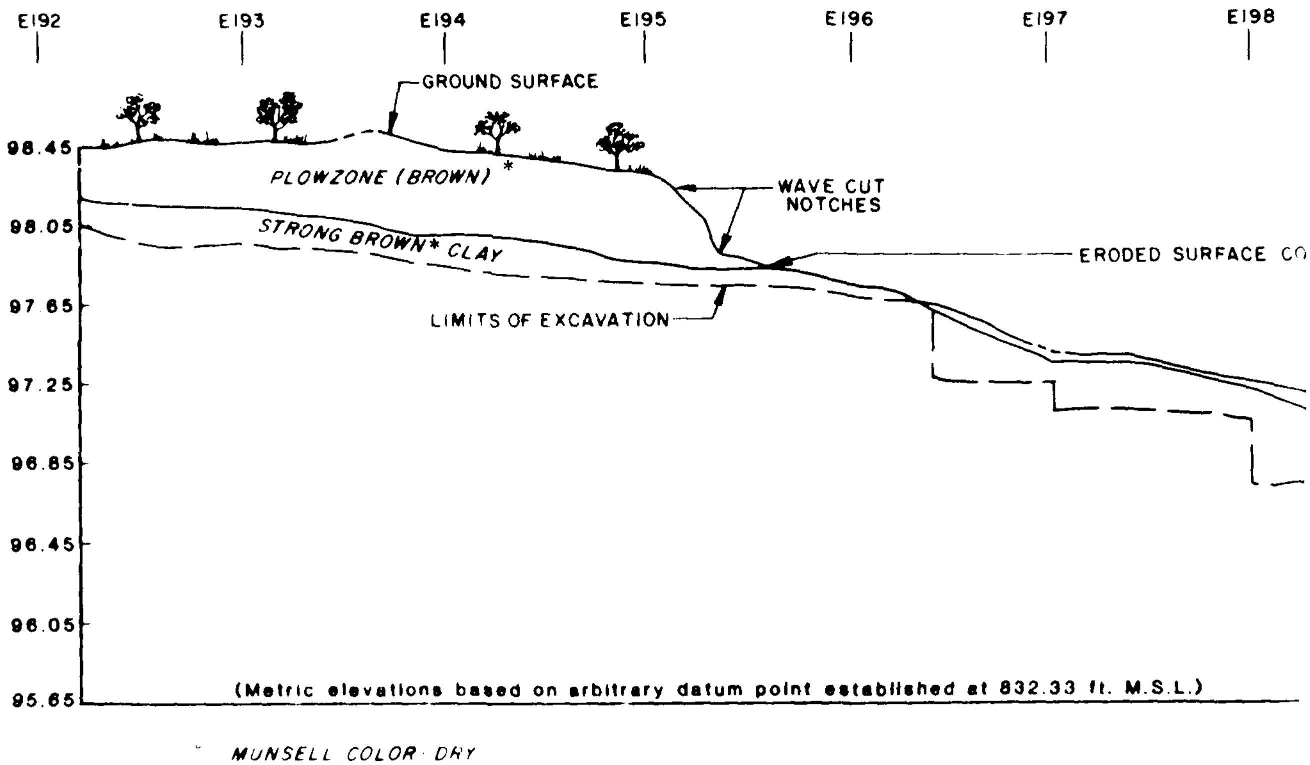
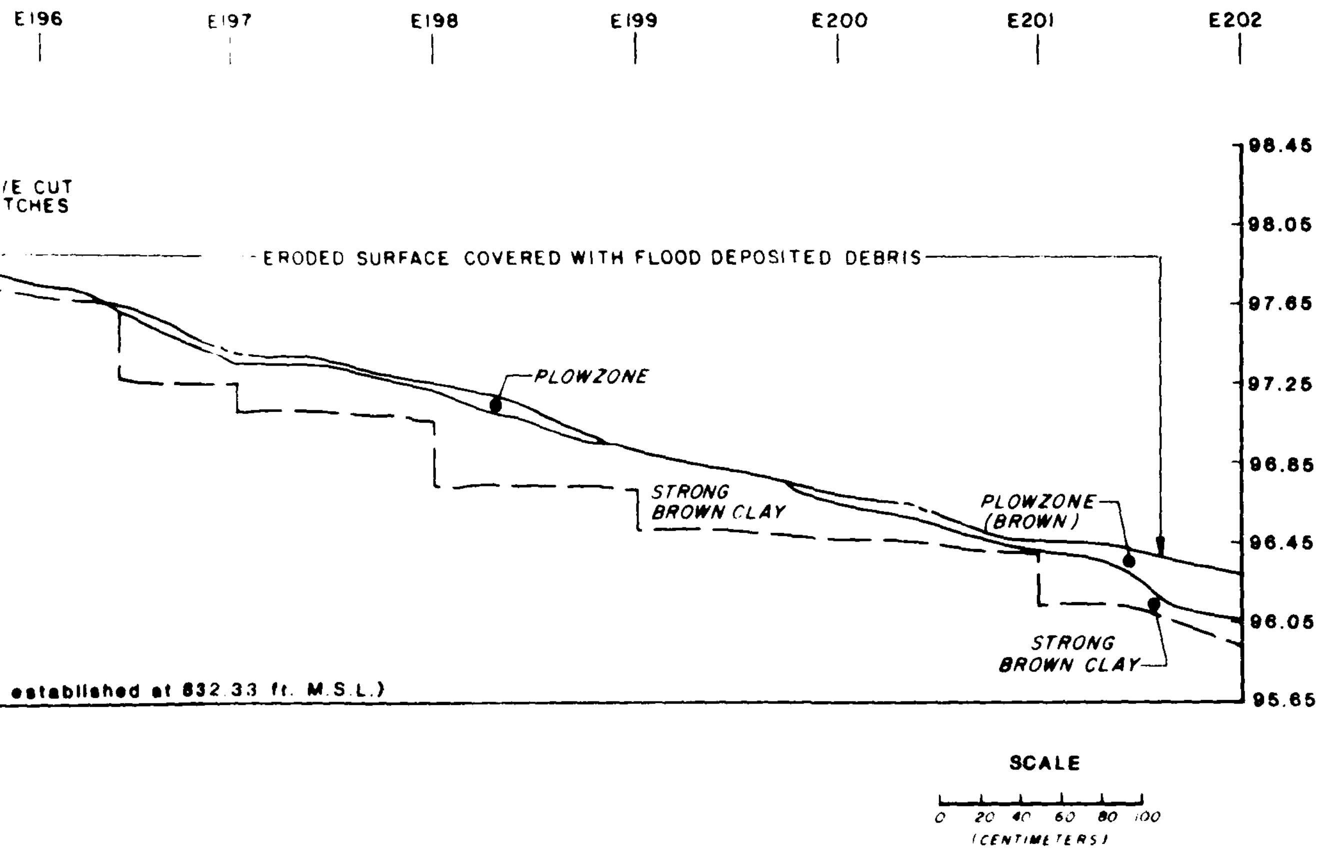


FIGURE C-3 SITE 23CL279 NORTH WALL PROFILE OF EAST
ALONG THE N975 LINE, BETWEEN



ORTH WALL PROFILE OF EAST-WEST EROSIONAL FACE AND TRENCH
ONG THE N975 LINE, BETWEEN E192.25 AND E202.

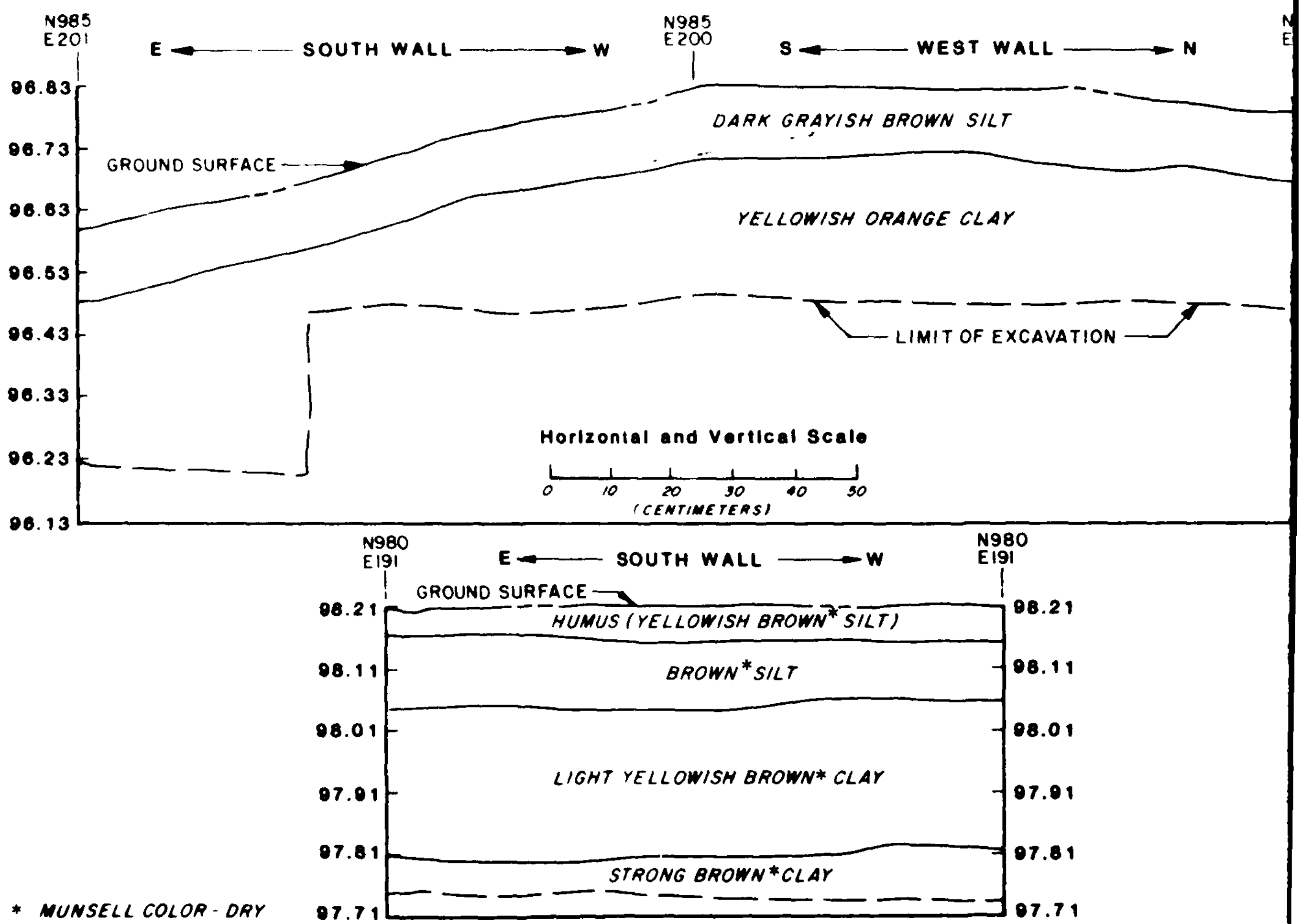
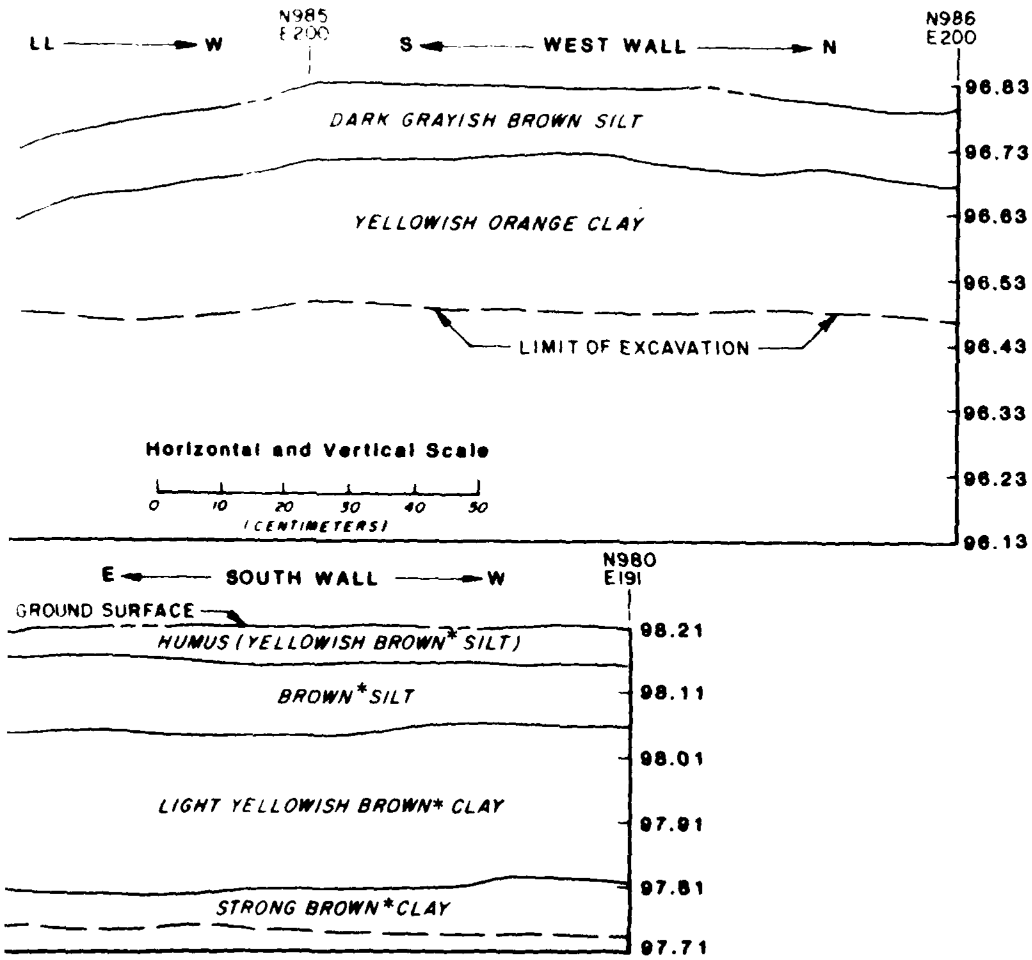


FIGURE C-4 SITE 23CL279: SOIL STRATIGRAPHY IN THE WALLS OF TWO TEST



L279: SOIL STRATIGRAPHY IN THE WALLS OF TWO TEST PITS

APPENDIX K

PLATES

Plate Captions

Plate	Description
2-1a	Smith's Dam, circa 1900, a few yards west (downstream) of Bridge Street in Smithville. Originally built here in 1826, it was destroyed and rebuilt three times, most recently in 1905. Photograph courtesy of C. C. Kindred and Jeff Dresser. (View to the southeast.)
2-1b	Remains of Smithville Dam in the early 1960's; it was torn out after the 1965 flood. Photograph courtesy of Marge Harris. (View to the east.)

PLATE 2-1a

PLATE 2-1b

Plate Captions

Plate	Description
2-2a	An iron wagon bridge spanned the Little Platte River in Smithville from 1876 to 1929, when it was destroyed by a flood; it was located at the site of the present bridge on Bridge Street. Photograph courtesy of Marge Harris and Link Evans. (View to the northwest.)
2-2b	A railroad bridge spanned the Little Platte River on the east side of Smithville from 1887 to 1939, when it was dismantled. Note the flood waters a few feet from the deck and the trees and brush impounded upstream of the bridge. Photograph coutesy of Marge Harris. (View to the northwest.)

PLATE 2-2a

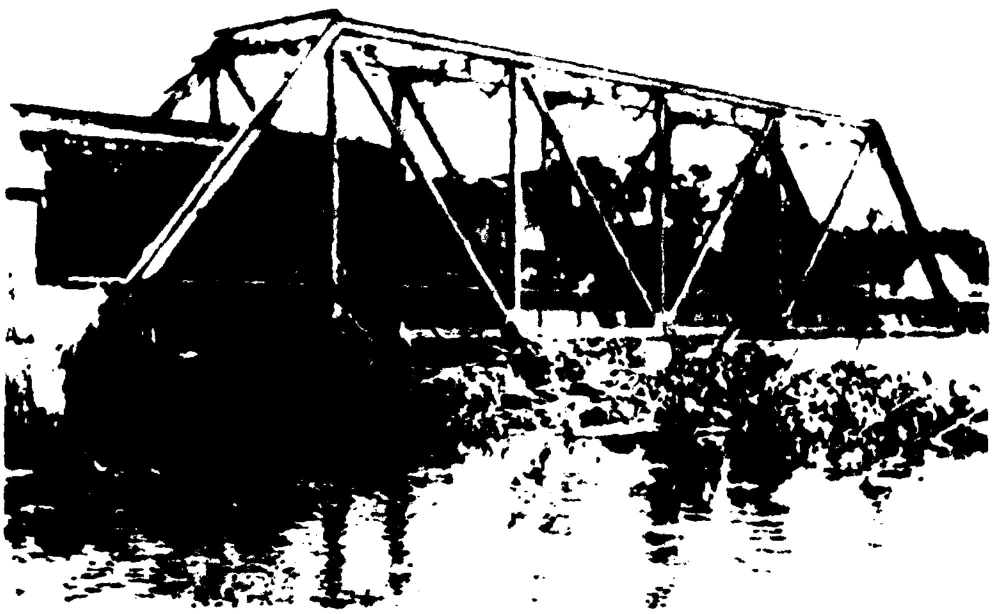


PLATE 2-2b

Plate Captions

Plate	Description
2-3	Miller Bridge over the Little Platte River, 3 miles northeast of Smithville. It was built about 1906 and the bottom of the bed was 18 feet above the river bank. (View to the southeast.)

PLATE 2-3

Plate Captions

Plate	Description
4-1a	Site 23 CL 208: General view of the purported burial Mound before excavation. (View to the north-northwest).
4-1b	Site 23 CL 208: View of the north wall of the trench excavated into the mound. The original surface is visible in the lower part of the exposure; note the mottled nature of the mound fill and the complete absence of skeletal remains. (View to the north).

PLATE 4-1a

PLATE 4-1b

Plate Captions

Plate	Description
4-2	Sites 23 CL 273-276: Aerial view (looking north) showing the localities on the floodplain and adjacent ridge where the surface vegetation and plowzone were removed by motorscraper. Sites 23 CL 274 and 276 occupy the two northernmost cleared areas; site 23 CL 275 is located in the easternmost cleared area and site 23 CL 273 the southwestern corner of the field. The Little Platte River is on the right.

PLATE 4-2

Plate Captions

Plate	Description
4-3a	Site 23 CL 275: View of the excavations after the flood of September 19, 1978. A three-inch rain in the valley led to the impoundment of a small lake behind the present Smithville Dam and the flooding of the two floodplain sites. (View to the northeast).
4-3b	Site 23 CL 275: View of Excavations after resumption following the flooding. The CL 225 designation was the original designation of all the sites in the locality. (View to the north).

PLATE 4-3a

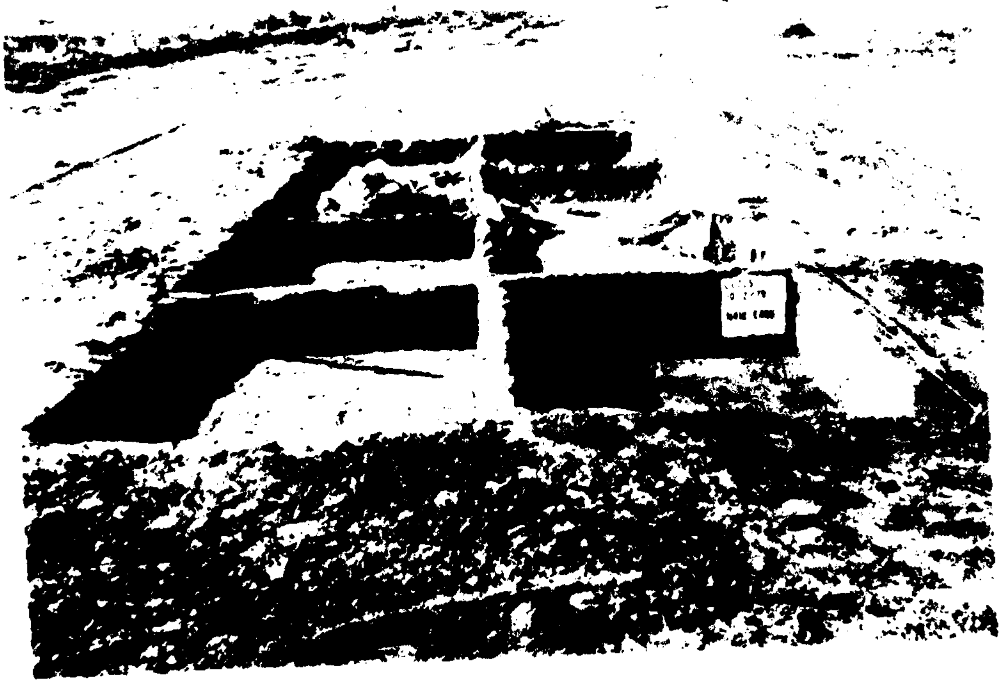


PLATE 4-3b

Plate Captions

Plate	Description
4-4a	Site 23 CL 226: General view of the excavations looking east. The dark ridges of earth were left by the end loader used to scrape the vegetation and plowzone from the site.
4-4b	Site 23 CL 226: View of partially excavated Feature 201 which was full of broken shell-tempered pottery, some mussel shell, and charcoal.

PLATE 4-4a

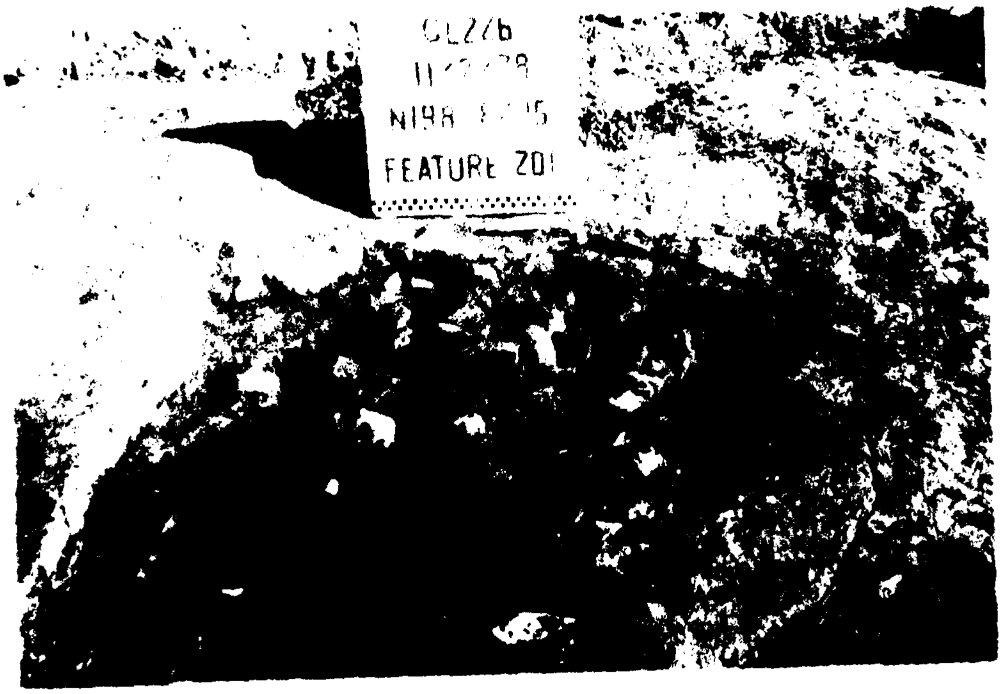


PLATE 4-4b

Plate Captions

Plate	Description
4-5a	Site 23 CL 229: View (to the north-northeast) of an area in the woods and on the bluff in the northeast part of the site where *in situ* cultural remains were recovered.
4-5b	Site 23 CL 229: View of a step-trench over the edge of the bluff in the northeast part of the site. The worker (Mr. Dennis Falkenburg) points to the locus where the small, ceramic animal effigy (Plate 5-2) was found.

PLATE 4-5a

PLATE 4-5b

PLATE 5-1

SHELL-TMPERED RIM SHERDS

Letter	Site and Cat. No.	Provenience
a*	23 CL 226: 138	Feature 201, Zone 1
b	23 CL 226: 173	Feature 201, Zone 2
c	23 CL 276: 612	Feature 2 (N875.0, E 277.7, El. 88.47)
d	23 CL 226: 119	Feature 201, Zone 1
e	23 CL 274: 1019	N1054.97, E353.66, El. 87.73
f	23 CL 276: 891	N873.37, E275.97, El. 88.58
g	23 CL 276: 707	Feature 2 (N875.51, E278.58, El. 88.57)

(*The 5 cm scale applies to all photographed specimens except a., in which case the scale equals 10 cm. The drawn rim profiles are one-half natural size; sherds b - g are natural size.)

PLATE 5-1

PLATE 5-2

GRIT-TEMPERED RIM SHERDS, POTTER ANVIL, UNIQUE
SHELL-TEMPERED RIM SHERD, AND CERAMIC ANIMAL EFFIGY

Letter	Site and Cat. No.	Provenience
a	23 CL 276: 1150/ 1112a	Feature 2 (N874.6, E276.2, EL. 88.6); N879, E287, El. 88.65 - 88.45
b	23 CL 229: 221	N258.31, E220.86, El. 73.59 (Zone 3)
c	23 CL 276: 1087	N878.13, E290.85, El. 88.54
d	23 CL 274: 993	N1056.54, E358.63, El. 87.76
e	23 CL 276: 351	Feature 2 (N874.72, E 277.66, El. 88.55)
f	23 CL 276: 1367	Feature 16 (northeast quadrant)
g	23 CL 229: 176	N280.16, E227.4, El. 73.16

(All photographed specimens are natural size. The rim profiles are one-half natural size.)

PLATE 5-2

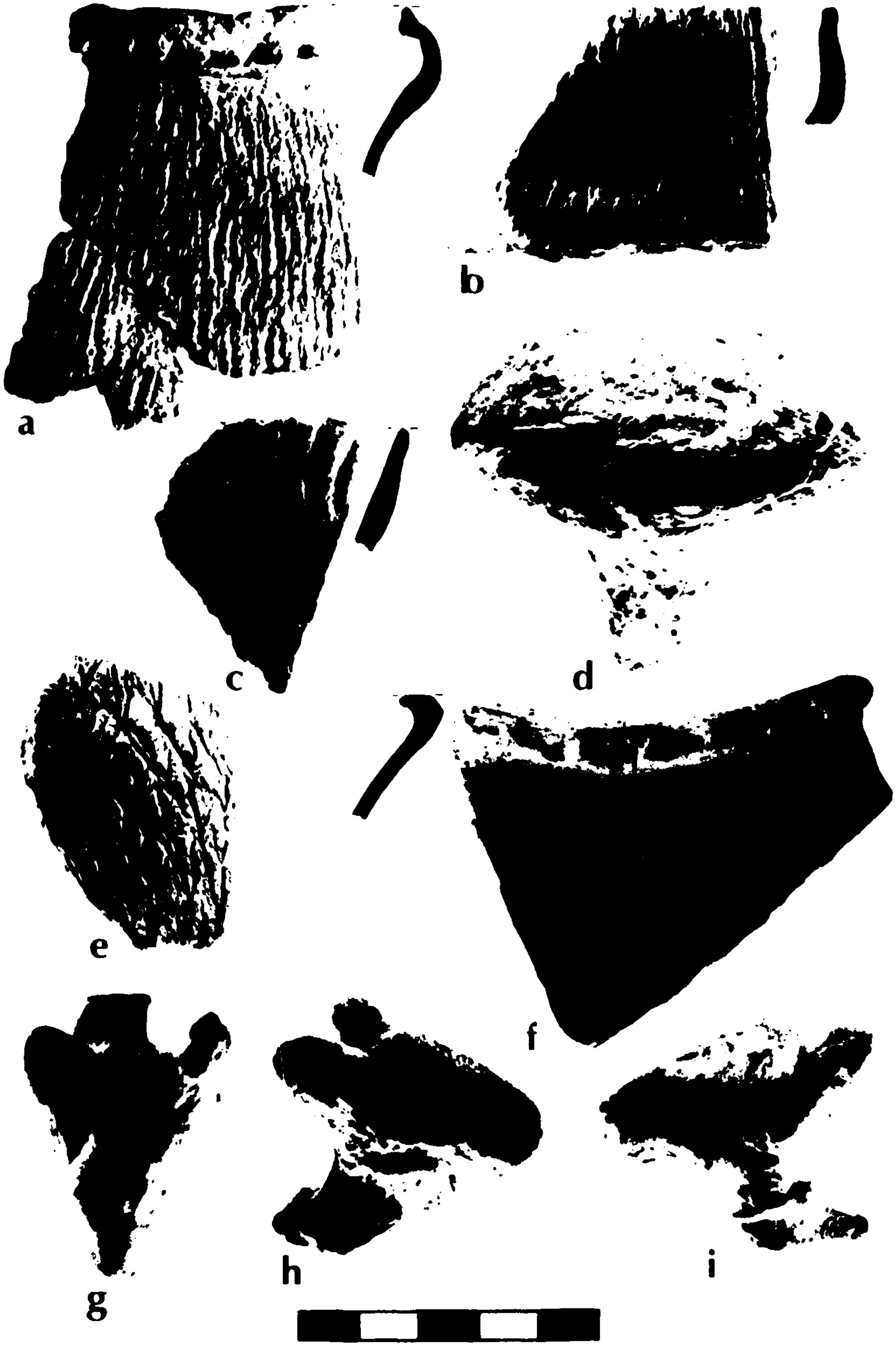


PLATE 6-1: PROJECTILE POINTS FROM VARIOUS SITES

a. Simple small triangular, 23 CL 276, cat. #1488
b. Side-notched small triangular, 23 CL 274, cat. #1192
c. Double side-notched small triangular, HM 5, cat. #1245
d. Side-and-basal notched, 23 CL 274, cat. #978
e. Side-notched small triangular, 23 CL 276, cat. #724
f. Side-notched small triangular, 23 CL 226, cat. #235
g. Small specimen, 23 CL 276, cat. #169
h. Side-notched small triangular, 23 CL 229, cat. #509
i. Small corner-notched, A, 23 CL 276, cat. #1605
j. Small corner-notched, A, 23 CL 276, cat. #770
k. Small corner-notched, A, 23 CL 276, cat. #1686
l. Small corner-notched, 23 CI 55, cat. #233
m. Small corner-notched, C, 23 CL 274, cat. #1623
n. Small corner-notched, C, 23 CI 60, cat. #42
o. Small lanceolate specimen, 23 CL 274, cat. #1418
p. Small corner-notched, B, 23 CL 274, cat. #1680
q. Small corner-notched, B, 23 CL 274, cat. #1626
r. Small corner-notched, B, 23 CL 229, cat. #165
s. Small corner-notched, B, 23 CL 274, cat. #908
t. Small corner-notched, B, 23 CL 274, cat. #1679
u. Medium corner-notched, 23 CL "FFF", cat. #147
v. Small corner-notched, B, 23 CL 270, cat. #188
w. Small corner-notched, B, 23 CL 274, cat. #1420
x. Small corner-notched, B, 23 CL 274, cat. #1624
y. Broad, corner-notched, 23 CL 279, catalog #39
z. Medium, subtriangular, 23 CL 274, cat. #918
aa. Medium, subtriangular, 23 CL 271 "A" cat. #221
bb. Medium, subtriangular, 23 CI 62 "Z", cat. #94
cc. Medium triangular, 23 CL 274, cat. #1627
dd. Medium side-notched, 23 CL 270, cat. #179

PLATE 6-1

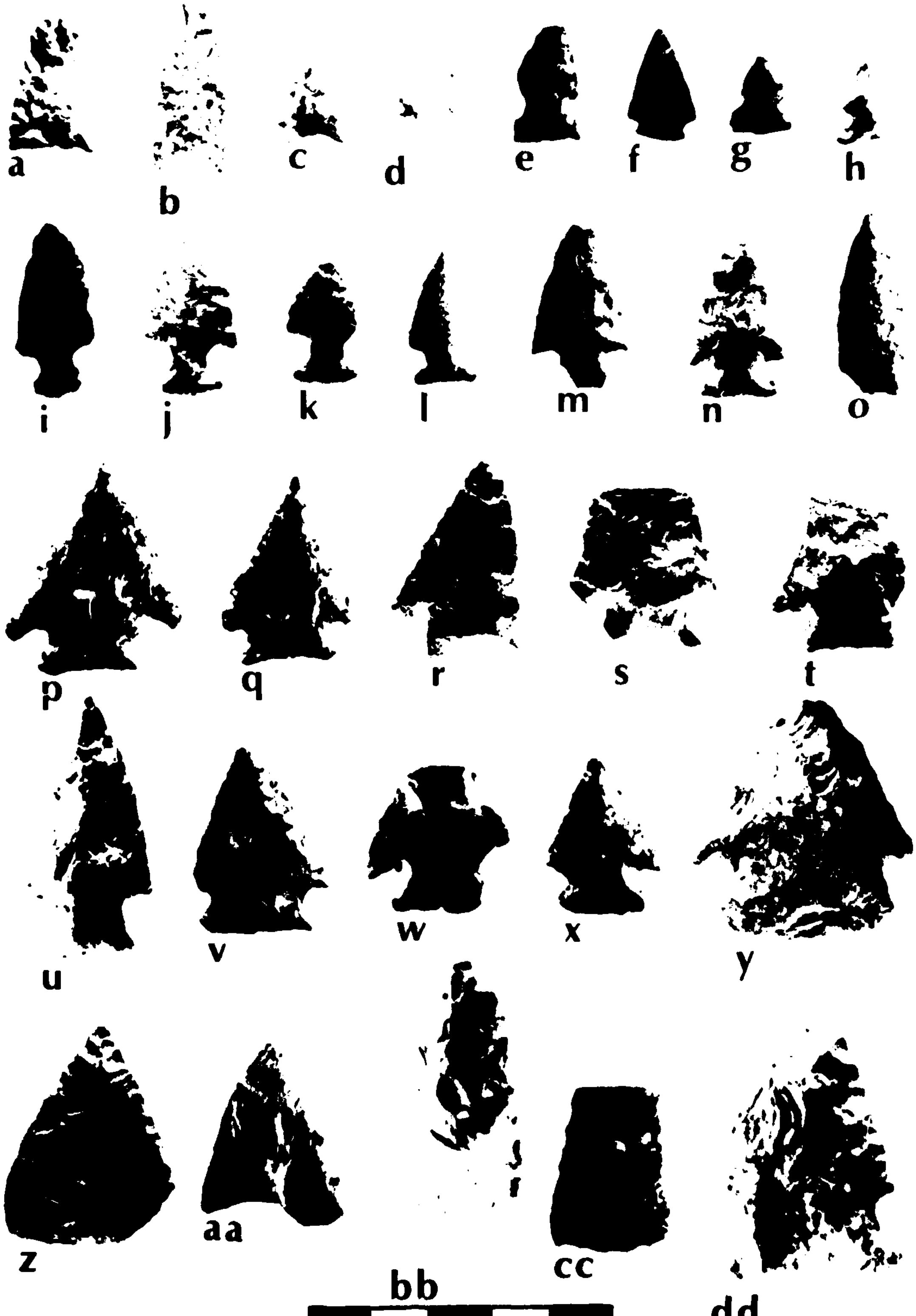


PLATE 6-2: SCRAPERS, RETOUCHED FLAKES, BONE TOOL

a. End scraper, 23 CL 272, cat. #108
b. End scraper, 23 CL 276, cat. #1685
c. End scraper, 23 CL 274, cat. #979
d. End scraper, 23 CL 229, cat. #134
e. End scraper, 23 CL 229, cat. #173
f. End-and-side scraper, 23 CL 226, cat. #1
g. End-and-side scraper, 23 CL 274, cat. #1300
h. End-and-side scraper, 23 CL 62, cat. #93
i. Bifacially retouched flake, 23 CL 226, cat. #237
j. Bilaterally retouched blade, 23 CL 274, cat. #976
k. Retouched flake, 23 CL 276, cat. #761
l. Retouched flake, 23 CL 279, cat. #203
m. Bilaterally retouched blade, 23 CL 275, cat. #44
n. Small assymetrical biface, 23 CL 276, cat. #1318
o. Pointed bond tool, 23 CL 276, cat. #166

PLATE 6-2

PLATE 6-3: PROJECTILE POINTS, DRILLS, GRAVERS

a. Lanceolate point, 23 CL 279, cat. #196
b. Lanceolate point, 23 CL 279, cat. #198
c. Lanceolate point, 23 CL "TT", cat. #170
d. Lanceolate point, 23 CL 279, cat. #197
e. Contracting-stem (hangfry?), 23 CL 271, cat. #1
f. Large, corner-notched point, 23 CL 272, Cat. #107
g. Snyders-like point, Test Pit 54, cat. #12
h. Small, side-notched point, 23 CL 232, cat. #2
i. Drill, 23 CL 274, cat. #980
j. Drill, 23 CL 274, cat. #1614
k. Lanceolate point (broken), 23 CL 279, cat. #70
l. Drill (reworked point), 23 CL 271, cat. #2
m. Graver, 23 CL 279, cat. #71
n. Graver, 23 CL 276, cat. # 869
o. Graver (reworked point), 23 CL 62, cat. #95

PLATE 6-3

PLATE 6-4: MISCELLANEOUS BIFACES, ETC.

a. Site 23 CL 275, cat. #79: Retouched Cortex Flake

b. Site 23 CL 62, cat. #91: Biface, pointed

c. Site 23 CL 226, cat. #231: Biface Fragment

d. Site 23 CL 275, cat. #16: Retouched Flake

e. Site 23 CL 232, cat. #8: Biface Fragment

f. Site 23 CL 276, cat. #1079: Pebble chopper

g. Site 23 CL 232, cat. #10: Chert Core

h. Site 23 CL 279, cat. #260: Narrow, thick biface ("Sedalia Digger")

PLATE 6-4

PLATE 6-5: PECKED, GROUND, AND ABRADED STORE TOOLS

a. Celt, 23 CL 279, cat. #204

b. Polished and inscribed, 23 CL 276, cat. #224

c. Fragmentary siltstone pipe, 23 CL 276, cat. #803 (side and top views)

d. Small grooved abrader, 23 CL 276, cat. #859b

e. Grooved abrader, 23 CL 276, cat. #859a

f. Mano, 23 CL 276, cat. #1305

g. 3/4 grooved axe, 23 CL 270, cat. #190

h. 3/4 grooved axe, 23 CL 278, cat. #216

PLATE 6-5

AD-A147 498 BEFORE SMITH'S MILL: ARCHAEOLOGICAL AND GEOLOGICAL INVESTIGATIONS SMITHVI..(U) GAI CONSULTANTS INC MONROEVILLE PA W P MCHUGH ET AL. JUN 82 4/4

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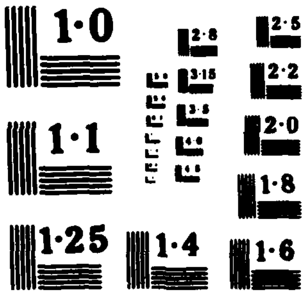
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PLATE 6-5

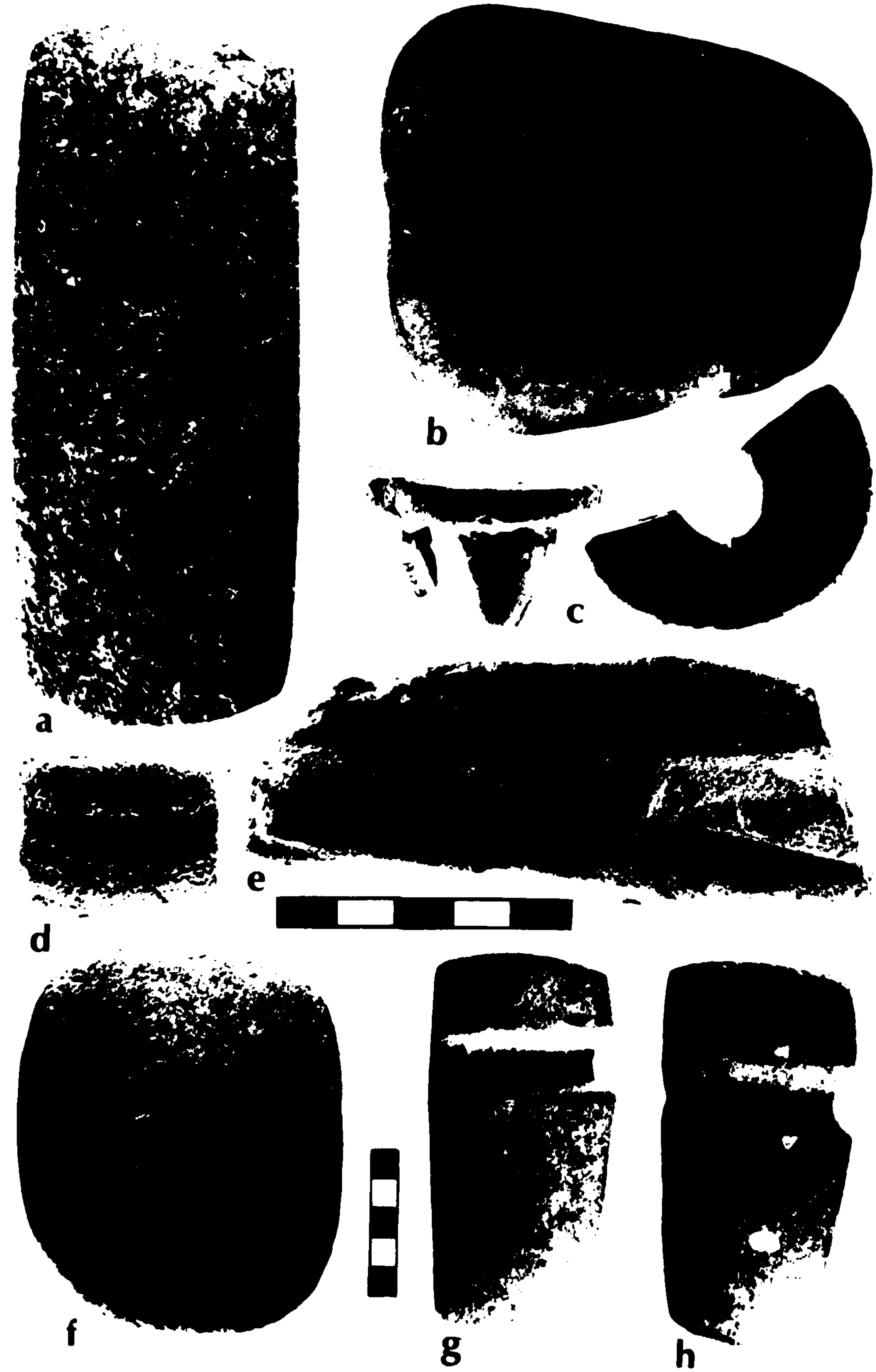

Plate Captions

Plate	Description
8-1a	Sites 23 CL 274 and 276: Clearing of the Surface Vegetation and the Upper Plowzone with a Caterpillar 727B
8-1b	Site 23 CL 274: Inspecting the Freshly Cleared Surface for Cultural Remains

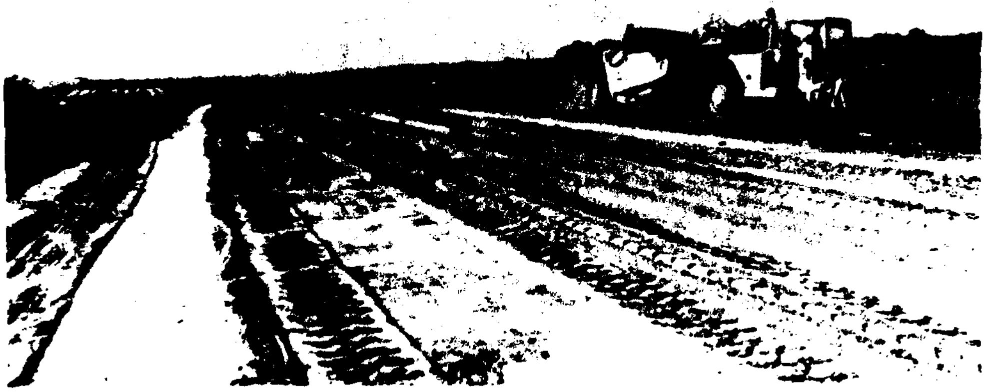

PLATE 8-1a

PLATE 8-1b

Plate Captions

Plate	Description
8-2a	Site 23 CL 274: General View of the Excavations; View to the Southwest. Features 101-106 were Concentrated in the Dark Square just Left of Center, and Feature 107 is ca. 4 m East.
8-2b	Site 23 CL 274: Feature 101 Partially Excavated Exposing the Dense Concentration of Baked Earth Fragments (Front Center) and the other Baked Earth Beginning to Emerge at the Surface. (View to the West; CL 225 was the former Designation of the Site Complex.)

PLATE 8-2a

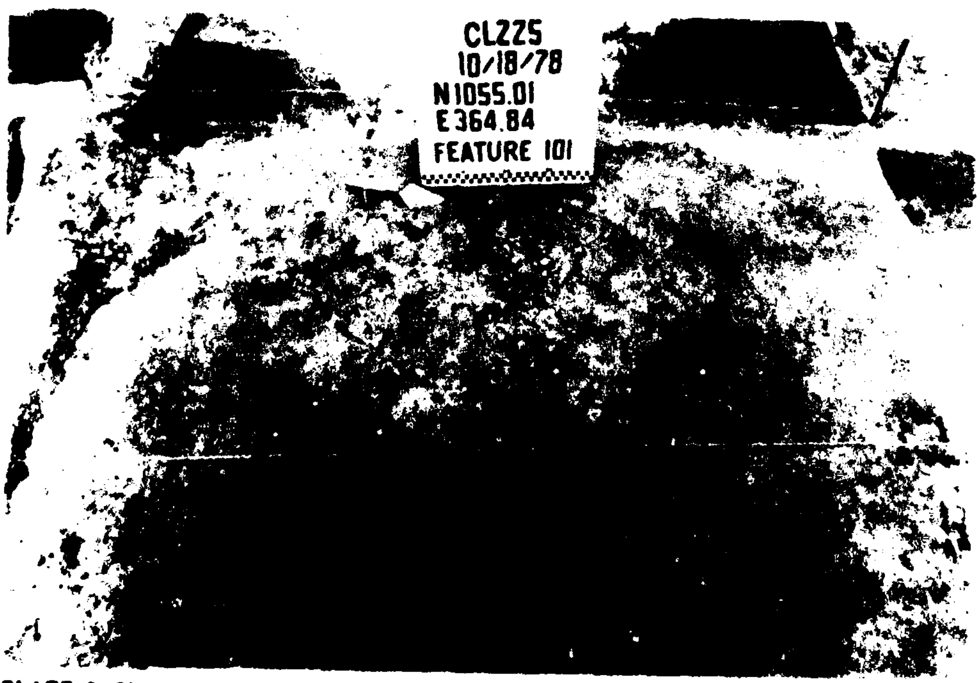

PLATE 8-2b

Plate Captions

Plate	Description
8-3a	Site 23 CL 274: Feature 106, a Shallow Basin Carved into the Light Brown Loessial Subsoil; the Vertical Wall of the Cross-Sectioned Basin Exhibits the Mixed Granular, Baked Earth, and Charcoal Matrix; View to the Northwest.
8-3b	Site 23 CL 274: Feature 107, a Refuse Filled Basin Located ca. 4 m East of Feature 101 Prior to Excavation; View to the East.

PLATE 6-3a

PLATE 6-3b

Plate Captions

Plate	Description
8-4a	Site 23 CL 276: General View of the Excavations, Looking to the West; the Rows of Pits (Foreground, Left and Right Sides, Central Background) are the Holes Dug in Order to Section the Postmolds. Right of Center is a Concentration of Fire-burned Rocks, Feature 17. The Standing Figure Holds a Rod in the Hole next to Postmold E at the Exact Center of the Structure.
8-4b	Site 23 CL 276: General View of the Excavations, Looking to the Southeast with the Little Platte River in the Background. Feature 17 is Near the Left Margin of the Photograph.

PLATE 8-4a

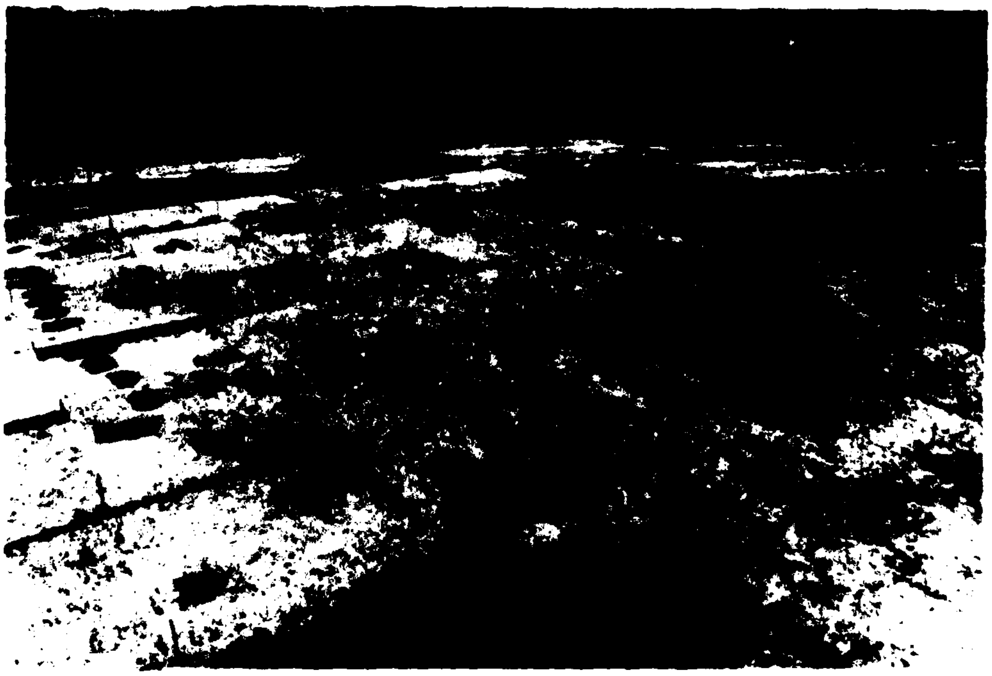

PLATE 8-4b

Plate Captions

Plate	Description
8-5a	Site 23 CL 276: Feature 2, Upper Surface of the Large, Trashfilled Midden West of the Four-Sided Structure; View to the North.
8-5b	Site 23 CL 276: Feature 16, a Trash Pit in the Northeast Corner of the Four-Sided Structure; View to the Northeast.

PLATE 6-5a

PLATE 6-5b

Plate Captions

Plate	Description
8-6a	Site 23 CL 276: Feature 17, a Concentration of Fire-burned Limestone Rocks in the North-Central Part of the Four-Sided Structure; View to the East-Northeast.
8-6b	Site 23 CL 276: Feature 20, East of the Northeast Corner of the Four-Sided Structure, Fully Exposed Concentration of Fire-burned Limestone Rocks; View to the North.

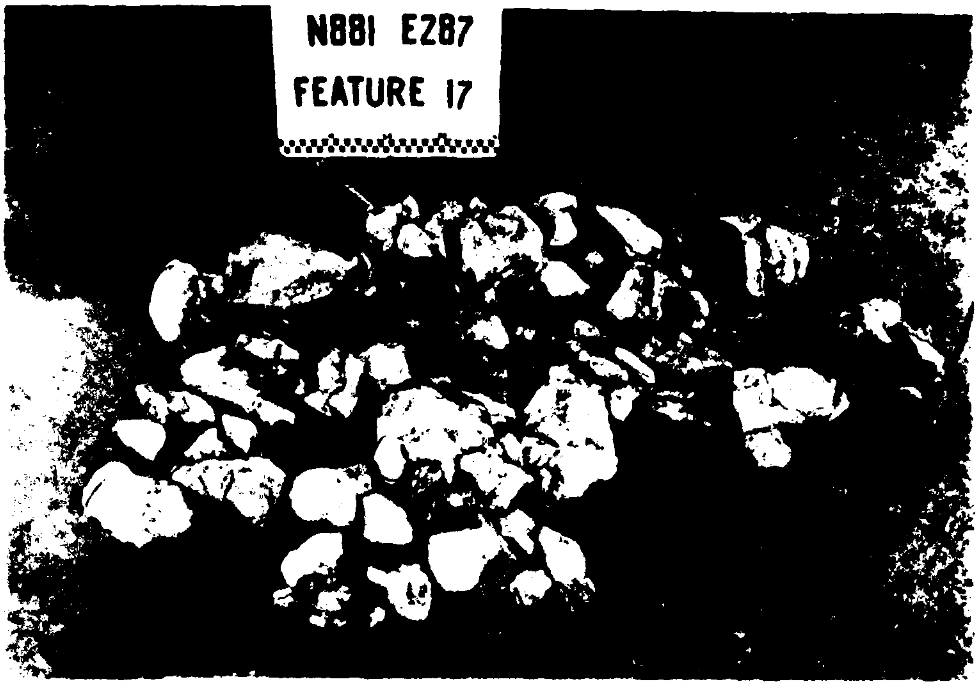

PLATE 8-6a


PLATE 8-6b

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Published by Roth & Langley, New York

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